Australian Model Engineering

January-February 2004

Issue 112

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2003 Traction Engine Rally

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n this issue:
- ☑ Casting with wax (making clock spandrels)
- ☑ How to make your own rivet tools
- ☑ A mini router table for finishing clock wheels

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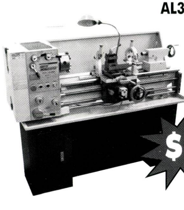

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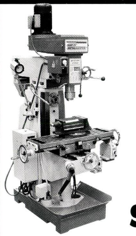

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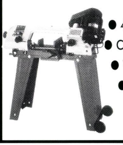

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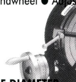

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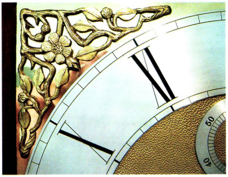

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Front cover

Jim Mitchell from Canberra took his beautiful brand new 3" scale Burrell Compound traction engine to Timbertown and won the AME Traction Action Trophy for his efforts. For more on the Miniature Traction Engine Rally turn to page 24

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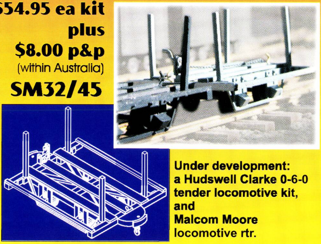

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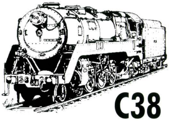

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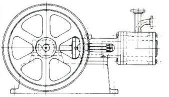

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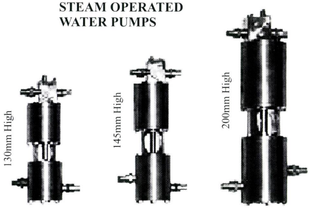

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Club Roundup …………………	Jan 16
Letter Box …………………	Jan 16
Classified Ads …………………	Jan 30
Mailout Date …………………	Feb 23

Comment

Is it really that bad after all?

In recent months I have received more phone calls and emails expressing dissatisfaction with the AALS insurance scheme and the AMBSC than any other topic. This increase in complaints indicated to me that some problems may be brewing which are not in the best interests of the hobby. For that reason I decided to 'stir the pot' in the last issue in order to provoke some discussion which would hopefully lead to a resolution of these differences. As most readers would be aware, I have often talked about the strength and growth of model engineering and I have also made it clear on several occasions that whilst *AME* has become the voice of the hobby in Australia, I do not see it as the role of this magazine or myself to take sides unless the hobby itself is under serious threat. I see *AME's* role more as a facilitator. That is still my position.

So, how serious are these problems. Given the number of complaints received previously I expected to be inundated with all sorts of views, but this did not happen. As we go to print I have received one letter re the insurance, and on the small boiler issue, only the response on page 61 from the AMBSC. Maybe dissatisfaction is not as **widespread** as it would seem. Sure there are some who are not happy with the way things are, and most likely from their viewpoint this is justified.

I am now aware that some steps are being taken in an attempt to make the group insurance scheme more equitable for all, but given the high cost of insurance, and the nature of our hobby, the extent to which this is achieved remains to be seen. By the time the next issue is in your hands we should know. Whilst most clubs should benefit to some degree there could well be a few who will not, and in the end they may have to make their own decisions as to how they can best satisfy their particular circumstances.

When you read *The Kettle* on page 61 you may have a better idea of the work done so far by the AMBSC to make boiler codes more all-encompassing, particularly with regard to little boilers. It clearly is not an easy task, entailing a lot of work and time, especially to satisfy the OH&S requirements in every state. Also, it is now clear that the AMBSC executive need more input from you, the hobby, as to what your requirements are and what your expectations of them are, along with any constructive assistance you can offer. Had they not responded to last issue's *Comment* we still would not know any of this.

Communication seems to keep emerging as a key factor and it appears that this is one area in which both the AALS and the AMBSC could do better — keeping everyone regularly informed on what is happening and why. The lack of effective communication up till now is probably the main reason for complaints being made. Club secretaries and boiler inspectors often do not help in this regard either when they fail to pass information on to their members. That is why the AALS and AMBSC have been offered columns in this magazine, to help circumvent all these problems. It is up to them as to how or when they use them. Now, let's work together like a team and get the most fun we can from this great hobby of ours!

David

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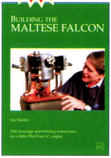

BUILDING THE MALTESE FALCON

Jim Shelley

Full drawings and building instructions for a 260cc Flat Four I.C. engine

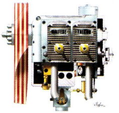
Building the Maltese Falcon

Jim Shelley has a passion for big model aircraft, in his case a 15 ft wingspan Taylorcraft, and developed the *Maltese Falcon* to replace the 100cc Flymo two-stroke engine he used in this, which drove an undersized prop too fast, and sounded wrong.

The result is a 260cc Flat Four, Side Valve engine which turns a (scale) 34" x 18" propeller at 2500 rpm, and measures 8" in length and depth, and 13" in width across the heads.

Essentially designed to be built from solid, certain parts, notably a magneto kit, and standard *Honda* pistons and valves can be used if you want to get your *Maltese Falcon* running as quickly as possible.

To be published on the 18th December



Whilst not a beginner's project, this engine can be built by any competent model engineer, and even if you just build one as your next project, will give you the satisfaction of blowing the club away, when you demonstrate it at an "On the Table" Night! And, of course, having built the engine, you can then build a giant model aircraft for it to power!

But what really intrigues us about the *Maltese Falcon* is what else you could drive with it, in some cases with modifications to the cooling arrangements; large scale model road vehicles, notably a model tractor, and 7¼" gauge railway motive power are obvious, but an outboard motor, a lawn mower and a motor bike would also all seem possible for the clever amongst you.

In this book you have the full drawing set of 11 sheets, reduced in size to fit A3 format, and 32 A4 pages of notes, hints and tips on building the engine, plus numerous photos of parts and set-ups for making them; this isn't a step-by-step construction manual, but it is all good solid information aimed at helping the builder to make a 'model' I.C. engine which really will make peoples' jaws drop! Wirebound with card covers. ***A superb project for the New Year!***

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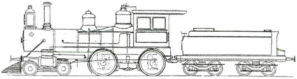

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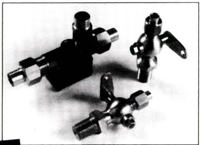

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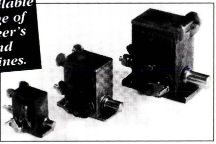

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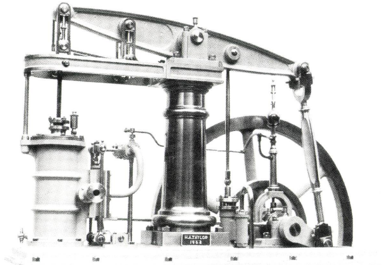

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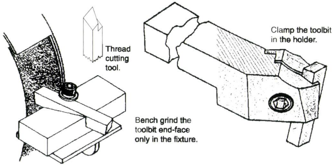
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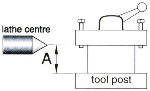

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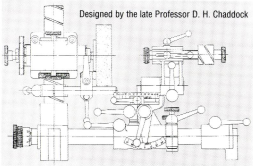

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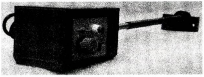
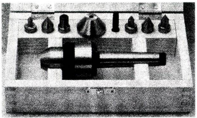


Power feed for MVS0940 MILL **$220.00**

Live Centre with Interchangeable Points

This set comes packed in a wooden case complete with 7 interchangeable tips from micro point to 30mm pipe plus a reverse point. The centre runs on bearings and is hardened and ground.

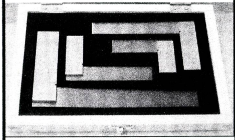
LCIS9P2MT - Suit MT2 $ 165.00
LCIS9P3MT - Suit MT3 $ 181.50



4 PIECE ENGINEERS SQUARE SET

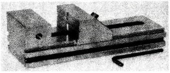
All squares are precision ground and accurate both inside and outside. Blades are ground for straightness and parallelism plus hardened.

Set includes 2", 3", 4" and 6" squares
ESS4P $48.80

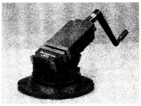


90 PAGE CATALOGUE AVAILABLE
$5.00 POSTED WITHIN AUSTRALIA

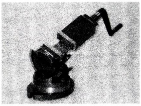
WORK HOLDING



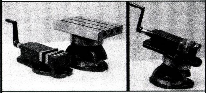
3" / 75 mm Toolmakers Vice
Solid one piece steel construction
110121 $154.00



SWIVEL and TILT VICE
110025 Vice 2"/ 50mm Precision $249.00
110026 Vice 3"/75mm Precision $275.00
110027 Vice 4"/100mm Precision $299.20



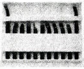
SWIVEL, TILT and TILT VICE - 3 WAY
110050 Vice 2"/50mm Precision $242.00
110051 Vice 3"/75mm Precision $330.00



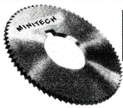
SWIVEL and TILT VICE with TABLE
PRECISION MODULAR VICE SYSTEM
Remove vice and fit table to convert to a tilt and swivel angle plate
110070 - 2"/50mm Vice size $352.00
110071 - 3"/50mm Vice size $425.00

TURNING TOOL SETS

8 PIECE High Speed Steel TOOL SET
Tools already ground to shape and ready to use
TTS8P06 - 6mm Shank $65.00
TTS8P08 - 8mm Shank $74.00
TTS8P10 - 10mm Shank $88.00



BRAZED TUNGSTEN CARBIDE
8 mm Shank
LVS1835-11, 5 Piece Set $39.00
LVS1835-14, 6 Piece Set $44.00
LVS1835-12, 11 Piece Set $64.90



All Prices Include GST

SLITTING SAWS - HSS

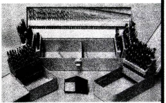
100mm/4" x 25.4mm/1" Bore $33.00ea
Blade width available;1/32"; 1/16";1/8".

75mm / 3"x 25.4mm/1" bore $19.25ea
Blade width Imperial:1/16" & 1/8"
Metric; 0.5, 0.75, 1.0, 1.25, 1.5 & 2mm

45mm / 1 3/4" x 5/8" bore $16.50ea
Imperial only
Blade width; 1/32", 1/16" & 3/32".

We stock a range of arbors to suit

DRILL SETS
H.S.S
06-001 **$135.95**
Drill Set 115pce
Fractions 1/16 - 1/2
Numbers 1-60
Letters A-Z



06-002 Number Drill Set 60pce, 1-60 **$53.90**
06-003 Number Drill Set 20pce 61-80 **$19.80**

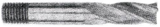
REAMERS

Adjustable Hand Reamer
with HSS blades from **$19.50**

Hand Reamer HSS Metric or Imperial
Spiral Flute from **$18.70**

Chucking or Machine Reamer HSS
Parallel Flute from **$18.70**

END MILLS and SLOT DRILLS



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Threaded Shank from **$9.90**

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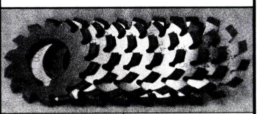
Threaded Shank from **$13.50**



MODULE GEAR CUTTERS
8 Cutters per set
from $236.50 per set
Sizes available include Module
.3, .5, .6, .7, .8,1.0, 1.25,1.5,1.75,2.0

Set includes:
Cutter No.1 12-13teeth
No2 14-16
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No6 35-54
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Making Clock Spandrels

by Rex Swensen

Drawings and digital images by the author

When I commenced construction of my eight day longcase clock to the design published in Alan Timmins' excellent book, I was determined to make every part in the clock — movement, dial and case. The movement was made to Alan's design, more or less, including my own wheel and pinion cutters in fully backed off six tooth form. The bell was machined from a solid block of cast bronze from the scrap box. The break arch case was to my own design but compatible with a circa 1790 London mahogany clock.

However, when it came to the spandrels, I fully expected to have to buy these. I looked at what was available locally and prowled the internet. I was not too excited about buying these sight unseen from the UK, and I felt that their fit on the dial plate was not particularly good. At about this stage a sculptor friend assured me that I could make them myself. All you need is some modelling clay and a design. The process involved the investment casting or "lost wax" method with wax impressions being made from a silicone rubber mould. The wax impressions are then sent to the foundry where the actual investment is made and the casting performed. I had read about investment casting over the years, but had never tried it.

As it happened I had a lump of modelling clay as used for clay model making in the automotive industry. This is an oil clay which softens with warmth and is then quite pliable like plasticine. But I needed a design. The break arch dial requires three spandrel types, four of the corner variety and two arch spandrels as a right and left hand pair. This meant modelling three different spandrels, which did not excite me too much!

The spandrel design

At this point inspiration struck, and it really gave me the enthusiasm to proceed and "give it a go". Why not design a single composite spandrel from which the three types could be cut out at the wax stage? After some hours on the CAD system, making very good use of the Mirror function, I came up with a suitable design as shown in **figure 1**. The amount of modelling would be greatly minimized. The design was tested in the CAD system by copying it several times, deleting the parts not required, as you would by trimming away the wax impressions, and finally placing the spandrel details on a drawing of the chapter ring.

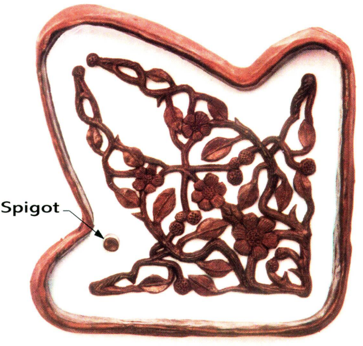


Photo 1 — *The final model ready for pouring the silicone rubber mould*

I am not a particularly artistic person, so the actual design selected is based on vines, leaves, flowers, thorns and berries. Not quite the same as the elegant abstract shapes you see on 18th century spandrels, but then I wasn't quite up to cherub faces or dolphins. Care must be taken at the modelling stage to provide enough connecting branches in the design to ensure that the finished individual spandrels have adequate structural strength. My sculptor friend gave the design the stamp of approval.

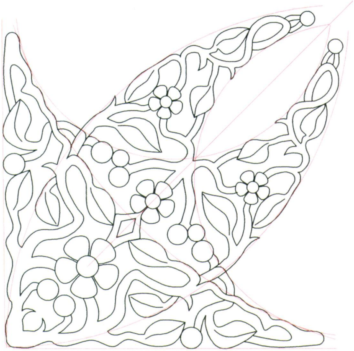


Figure 1 — *Composite spandrel design*

Making the model and the silicone mould

The final design was printed out full size and stuck onto the reverse side of a perspex sheet. Then modelling began. It was a slow, fiddly process! About 15 hours all told, including some rework and redesign. I did find, however, that I could do it while watching the cricket on TV. From the commentary I knew just when to look up and see the replay!

To assist in attaching the finished spandrels to the dial plate, a 6 mm diameter by 12mm long cylinder of clay was placed on one side. The resultant wax cylinder would be subsequently "welded" to the wax behind the large flower for machining to form an attachment spigot.

I then visited the foundry to check up on the process from here on. They told me they could not use my clay model unless it could be taken off the perspex and fired! My expectations were to make an open faced silicone mould, then pour the molten wax into it and strickle off the excess. But this did not appeal to them — they like to have an enclosed split mould and inject the wax into it. "What if I were to make the wax impressions myself and bring them to you?" "That would be excellent" was the reply. My foundry contact was very accommodating and gave me a small bag of wax for the job and wished me luck! The quoted price was similar to purchased finished spandrels but had the decided advantage of being home made and a good fit to the dial configuration.

Fortunately my sculptor friend had a small quantity of the

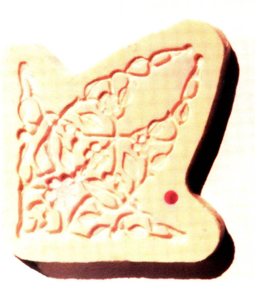


Photo 2 — *The silicone mould, face upper-most*

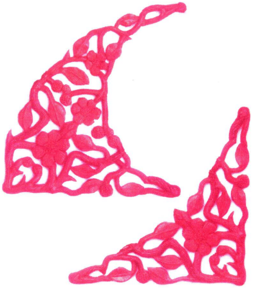


Photo 3 — *Two of the wax impressions*

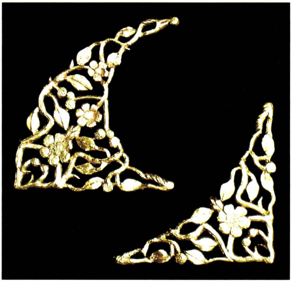


Photo 4 — *Two of the finished spandrels*

liquid silicone rubber and the catalyst. A wall about 12mm high was made in clay around the model. The clay model was given a coat of polythene parting agent as used in fibre glass work. Previous tests had shown this to be beneficial. **Photo 1** shows the final model ready for pouring the silicone rubber mould. When the silicone is mixed with the catalyst, it is very difficult to prevent air bubbles being entrained. A vacuuming machine should be used to remove these, but they were not that critical in my case. When the mould was poured they mostly rose to the surface even though the mixture is like treacle in consistency.

After 24 hours the silicone had cured and was carefully removed from the perspex sheet. A few small bubbles were evident in the vees of branches, etc. but these were only about 1 mm diameter and could easily be trimmed out from the wax impressions. Unfortunately the clay model parted from the perspex sheet and was mostly destroyed, so it was a one shot attempt. **Photo 2** shows the silicone mould, face upper most.

Casting the wax impressions

The pink wax melts at 65°C so it could be safely melted over the gas cook top in the kitchen. A small pot was made up to hold one cast's worth of wax. The molten wax was gently poured into the mould having warmed it with a hair dryer beforehand. A piece of stiff cardboard was then used to strickle off the excess wax leaving the impression well filled. After a few minutes the wax sets and it can be carefully eased out of the mould by flexing the mould back and forth. The silicone mould was 10mm thick, but was very flexible. The wax is very spindly and delicate so care must be exercised.

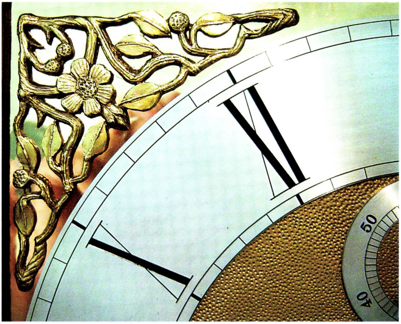


Photo 5 — *One of the spandrels on the clock dial*

The impressions had some "flash" over the surface in places, and this was carefully removed with a modelling knife, as were the small bubbles mentioned earlier. Each casting was then trimmed to yield the desired shape for the respective spandrels. Two are shown in **photo 3**. It was found that any imperfections could be fixed by placing the wax spandrels back into the mould and "welding" in some more wax with a hot wire. Also the spigots were similarly welded into the back of the large flower while the wax was still in the mould.

Final casting in brass

The six wax spandrels were then hand delivered to the foundry, which, incidentally, specialized in jewellery casting such as rings and broaches in gold and silver, but also did base metals such as brass. They would weld on wax sprues to the back of the wax impressions for gating the molten brass, building a "tree" from the six impressions, investing it in the ceramic material, firing this to melt out the wax, casting the brass, and finally breaking away the ceramic shell.

Several days later I had a call from the foundry. "I have good news and bad news – the castings came out very well but the fettler snipped off most of your spigots as well as the sprues!" I had previously explained the importance of the spigots for attaching the spandrels to the dial plate. On examination it was not that bad. There was just enough left on most of them

Photo 6 — *The entire finished dial*

to machine and thread the spigot. A couple required blind tapping into the back of the flower, and soldering in a screwed stud.

The detail on the castings was excellent – just like the original clay model, but the surface finish was rather dull. The best way of polishing these, I was told, is with a very light jeweller's rotary brass wire brush, but I do not have one so I used a brass "suede" brush, metal polish and elbow grease. They were then lacquered to prevent tarnish. **Photo 4** shows two of the finished spandrels, and **photo 5** shows one on the clock dial. Finally, **photo 6** shows the entire dial and **photo 7** the finished clock.

So, did I achieve my goal of making everything in the clock? Well, almost. The numeric engraving on the seconds ring and the engraving on the signature cartouche plate were done by computer CNC. However I did provide the font files and sat at the operator's elbow while we jointly programmed the CNC job.

Overall I am very well pleased with the finished clock. It makes a gracious addition to our home.

Photo 7 — *The finished clock*

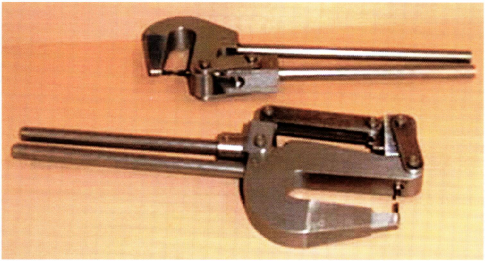
Rivet Tools

by Dave Taylor

Digital images and drawings by the author

This rivet tool was made after reading Doug Hewson's glowing praise of the Maidstone version and then watching him using his battered Maidstone model at a Midlands Model Exhibition, as he dexterously closed rivets in a wagon underframe while discoursing to interested visitors on wagon building in general. I was greatly impressed. I was struggling to complete a $3^1/_2$" gauge modified Hall started more years ago than I care to remember. I got to a point where I had to remove a bracket in the footplate framing, previously riveted on to the frames, for modification. Removal was relatively easy except that I sadly underestimated the holding power of the brass rivets that I had used. Many years ago at an exhibition I overheard a conversation on the Blackgates stand to the effect that tests had shown little difference in strength between a riveted joint made using brass rivets compared with a similar one made using iron ones. In the small sizes that we use, my experience is that this is true.

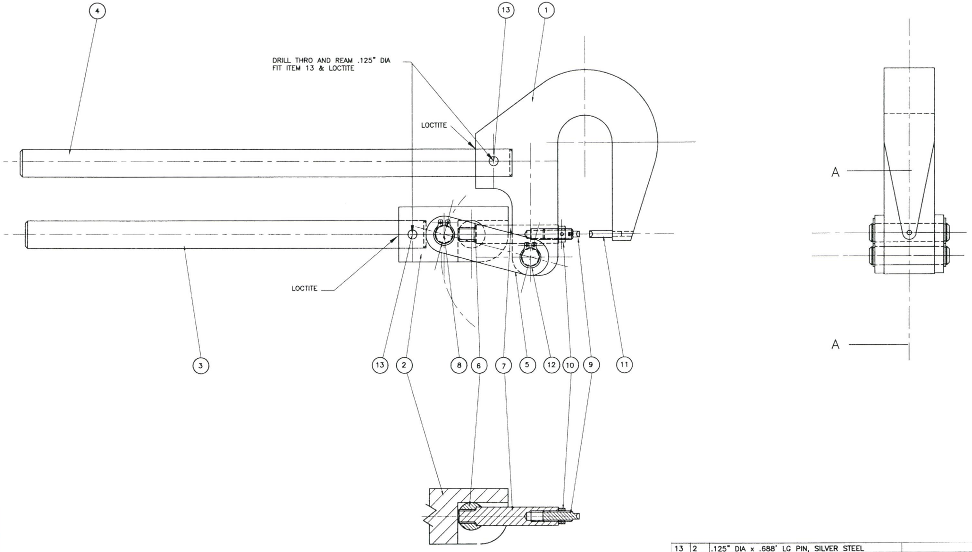
The main problem was to reset the rivets when assembling the modified bracket to the frame. Originally the running board frame had been riveted in sequence on to the frames and access at that time was no problem. Once assembled however access to the inner pieces was very restricted. The obvious answer was to use a riveting tool or in fact two tools, one a standard version and one with long reach jaws and "inline" handles. This second tool was designed to fit over the frame and close rivets between the bracket and frame. The standard tool was for the rivets between the bracket and hanging plate of the running board.



The completed rivet tools #1 and #2

Tools #1 and #2

I live in a southern rural area of British Columbia, Canada. Not a place noted for the availability of anything except trees, game fish and black bears. The cost of shipping heavy cast items from the UK can be close to the cost of the items themselves so I frequently machine from the solid or fabricate instead of using proprietary castings. For the long reach tool there were no castings available so I decide to design my own versions of the rivet closer. Both tools were required to have an anvil that would get into the tight spaces where the rivets were close to the angle of the bracket. Castings are available



PART SECTION ON "A-A"

RIVET TOOL #1

MACHINE NOTE:

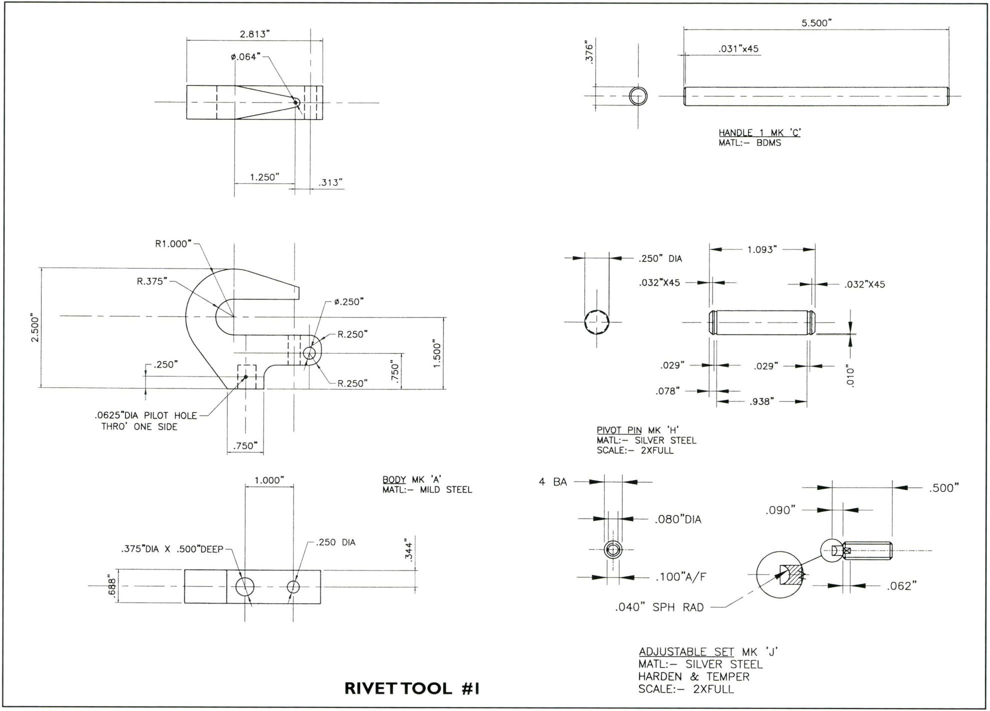
UNLESS OTHERWISE NOTED:
ALL FRACTIONS ±1/64"
ALL DECIMALS ± .005"
BREAK ALL SHARP EDGES .005" x 45°

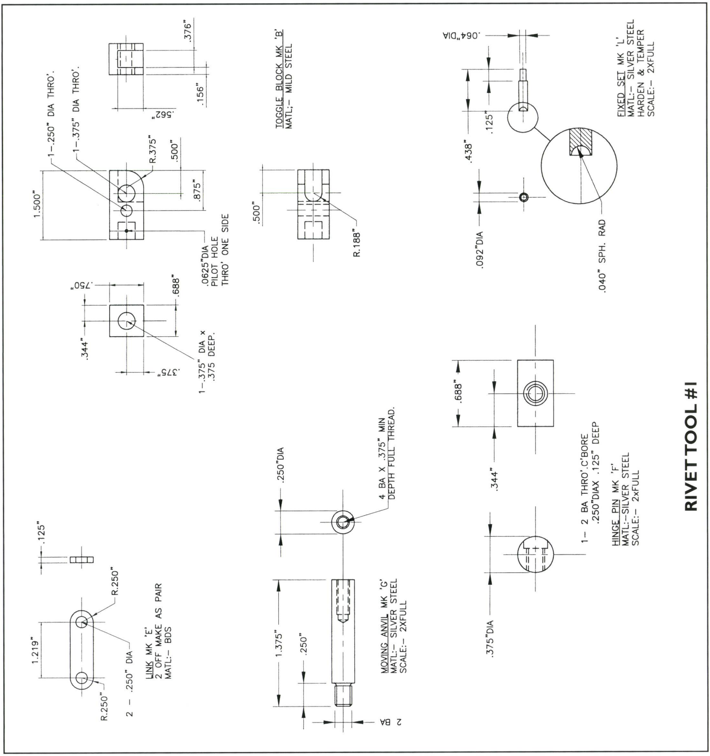
FABRICATION NOTE:

UNLESS OTHERWISE NOTED:
ALL FRACTIONS ±1/32" UP TO 24", ±1/16" 24" AND UP.
BREAK ALL SHARP EDGES

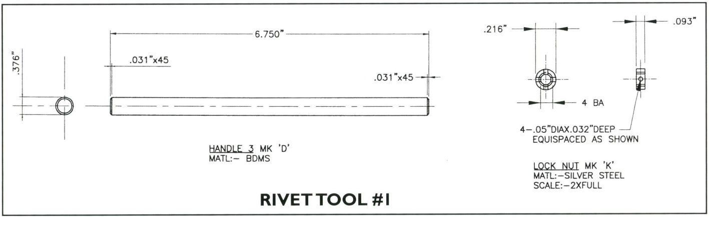
ITEM	NO. OFF	DESCRIPTION	PART NUMBER
13	2	.125" DIA x .688' LG PIN, SILVER STEEL	
12	4	CIRCLIP .250" N 1400 EXTERNAL	
11	1	FIXED SET	RS110 -MK L
10	1	NUT	RS110 -MK K
9	1	ADJUSTABLE SET	RS110 -MK J
8	2	PIVOT PIN	RS110 -MK H
7	1	MOVING ANVIL	RS110 -MK G
6	1	HINGE PIN	RS110 -MK F
5	2	LINK	RS110 -MK E
4	1	HANDLE 3	RS110 -MK D
3	1	HANDLE 1	RS110 -MK C
2	1	BLOCK	RS110 -MK B
1	1	BODY	RS110 -MK A

RIVET TOOL #1

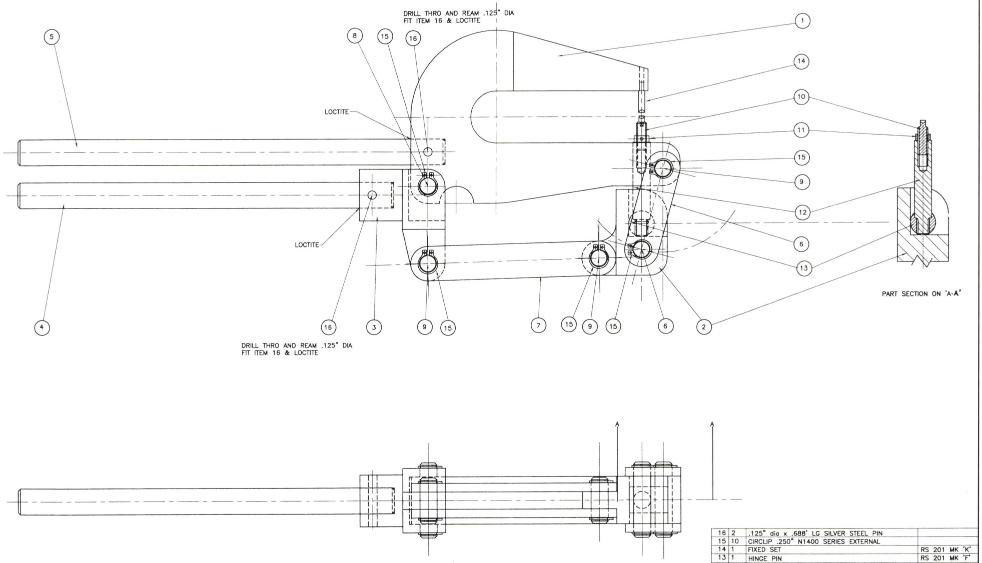

2.813"
ø.064"
1.250"
.313"
5.500"
.031"x45
.376"
HANDLE 1 MK 'C'
MATL:– BDMS
R1.000"
R.375"
ø.250"
R.250"
.250"
R.250"
2.500"
.750"
1.500"
.0625"DIA PILOT HOLE THRO' ONE SIDE
.750"
.250" DIA
1.093"
.032"X45
.032"X45
.029"
.029"
.078"
.938"
.010"
PIVOT PIN MK 'H'
MATL:– SILVER STEEL
SCALE:– 2XFULL
1.000"
BODY MK 'A'
MATL:– MILD STEEL
.375"DIA X .500"DEEP
.250 DIA
.344"
.688"
4 BA
.080"DIA
.100"A/F
.040" SPH RAD
.500"
.090"
.062"
ADJUSTABLE SET MK 'J'
MATL:– SILVER STEEL
HARDEN & TEMPER
SCALE:– 2XFULL



RIVET TOOL #I



RIVET TOOL #I



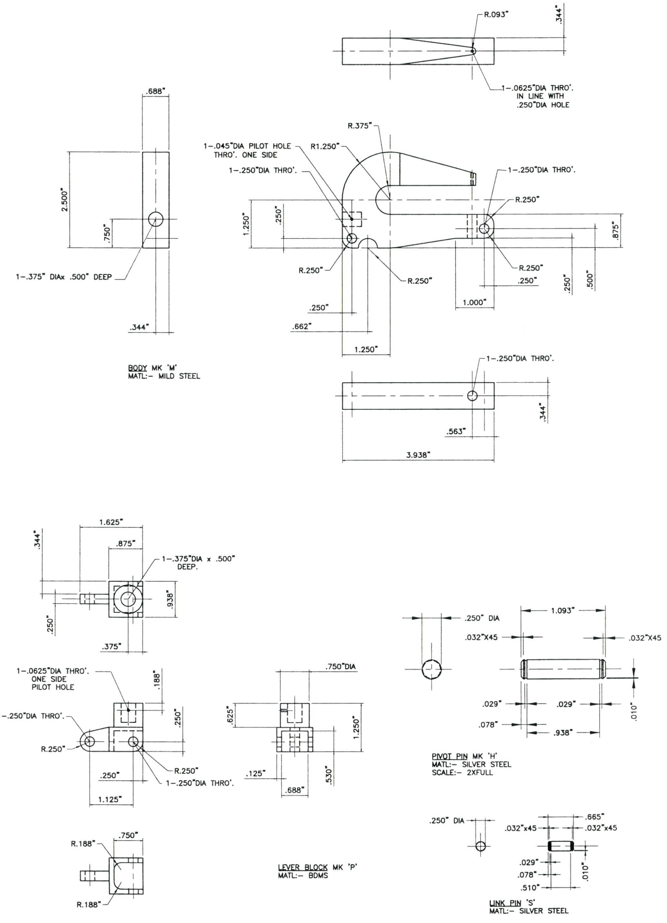
DRILL THRO AND REAM .125" DIA
FIT ITEM 16 & LOCTITE

DRILL THRO AND REAM .125" DIA
FIT ITEM 16 & LOCTITE

PART SECTION ON 'A-A'

RIVET TOOL #2

ITEM	NO. OFF	DESCRIPTION	PART NUMBER
16	2	.125" dia x .688' LG SILVER STEEL PIN	
15	10	CIRCLIP .250" N1400 SERIES EXTERNAL	
14	1	FIXED SET	RS 201 MK 'K'
13	1	HINGE PIN	RS 201 MK 'F'
12	1	MOVING ANVIL	RS 201 MK 'G'
11	1	NUT	RS 201 MK 'K'
10	1	ADJUSTABLE SET	RS 201 MK 'J'
9	2	LINK PIN	RS 201 MK 'S'
8	3	PIVOT PIN	RS 201 MK 'H'
7	2	TRANSFER LINK	RS 201 MK 'R'
6	2	LINK	RS 201 MK 'E'
5	1	HANDLE 2	RS 201 MK 'Q'
4	1	HANDLE 1	RS 201 MK 'C'
3	1	LEVER BLOCK	RS 201 MK 'P'
2	1	TOGGLE BLOCK	RS 201 MK 'N'
1	1	BODY	RS 201 MK 'M'



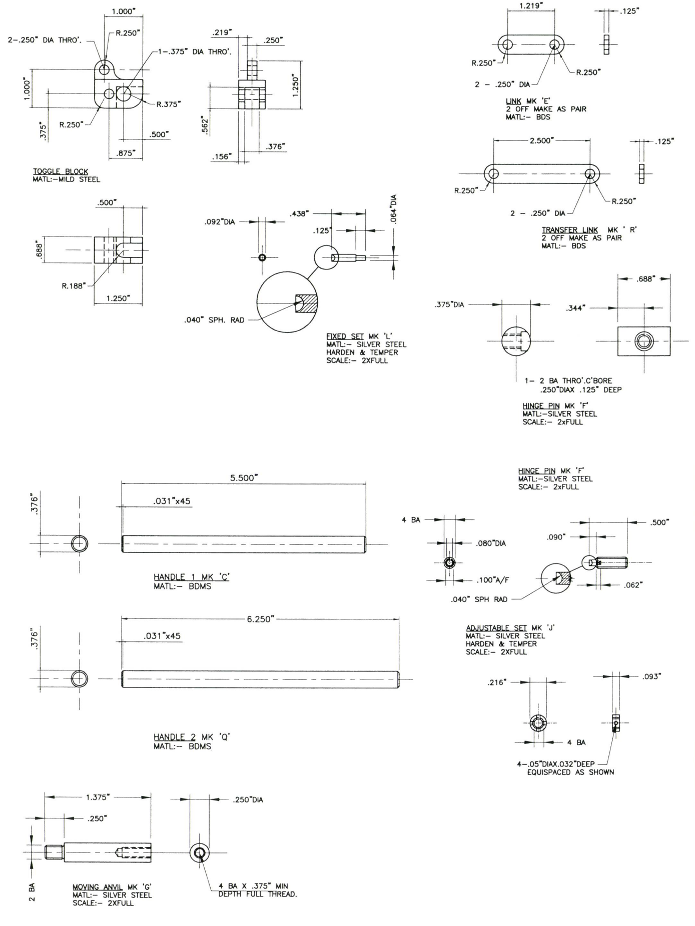
BODY MK 'M'
MATL:- MILD STEEL

LEVER BLOCK MK 'P'
MATL:- BDMS

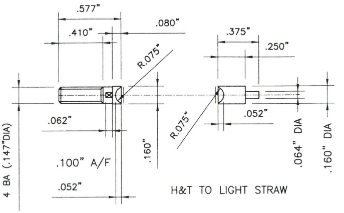
PIVOT PIN MK 'H'
MATL:- SILVER STEEL
SCALE:- 2XFULL

LINK PIN 'S'
MATL:- SILVER STEEL

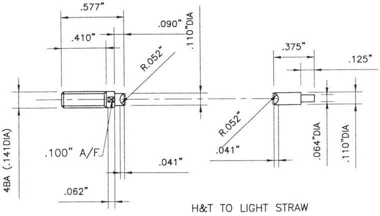
RIVET TOOL #2


1.000"
2-.250" DIA THRO'.
R.250"
1-.375" DIA THRO'.
1.000"
R.375"
.375"
R.250"
.500"
.875"
.219"
.250"
1.250"
.562"
.376"
.156"
TOGGLE BLOCK
MATL:-MILD STEEL
.500"
.688"
R.188"
1.250"
.092"DIA
.438"
.125"
.064"DIA
.040" SPH. RAD
FIXED SET MK 'L'
MATL:- SILVER STEEL
HARDEN & TEMPER
SCALE:- 2XFULL
1.219"
.125"
R.250"
R.250"
2 - .250" DIA
LINK MK 'E'
2 OFF MAKE AS PAIR
MATL:- BDS
2.500"
.125"
R.250"
R.250"
2 - .250" DIA
TRANSFER LINK MK ' R'
2 OFF MAKE AS PAIR
MATL:- BDS
.688"
.375"DIA
.344"
1- 2 BA THRO'.C'BORE
.250"DIAX .125" DEEP
HINGE PIN MK 'F'
MATL:-SILVER STEEL
SCALE:- 2xFULL
HINGE PIN MK 'F'
MATL:-SILVER STEEL
SCALE:- 2xFULL
5.500"
.376"
.031"x45
HANDLE 1 MK 'C'
MATL:- BDMS
4 BA
.080"DIA
.100"A/F
.500"
.090"
.062"
.040" SPH RAD
ADJUSTABLE SET MK 'J'
MATL:- SILVER STEEL
HARDEN & TEMPER
SCALE:- 2XFULL
6.250"
.376"
.031"x45
HANDLE 2 MK 'Q'
MATL:- BDMS
.216"
.093"
4 BA
4-.05"DIAX.032"DEEP
EQUISPACED AS SHOWN
1.375"
.250"
.250"DIA
2 BA
MOVING ANVIL MK 'G'
MATL:- SILVER STEEL
SCALE:- 2XFULL
4 BA X .375" MIN
DEPTH FULL THREAD.

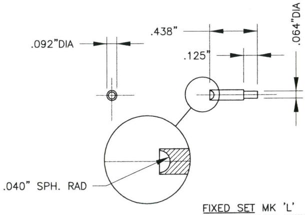
RIVET TOOL #2



SETS FOR HEWSON 5/64" RD HEAD Cu RIVETS.
MATL. SILVER STEEL
SCALE:– 2.5 x FULL



SETS FOR HEWSON 1/16" RD HEAD Cu RIVETS.
MATL. SILVER STEEL
SCALE:– 2.5 x FULL



FIXED SET MK 'L'
MATL:– SILVER STEEL
HARDEN & TEMPER
SCALE:– 2XFULL

RIVET TOOL SETS

from Vancouver made from my own patterns but as usual I decided to machine the bodies from a lump of steel that happened to be lying about.

I own an Alba 9" shaping machine (a much under rated tool for the small work shop) which I use for bulk material removal and which, in conjunction with my band saw to rough out the profiles, was used to produce the bodies of the tools. For those who do not posses a shaping machine the healthy and/or masochistic model engineers may hacksaw and file to shape alternately any of the popular mill/drill machines or the lathe can be used to shape the bodies.

The bodies of both tools were formed from lumps of (very rusty) steel with a yield strength of about 36,000 lb/sq in (the ASTM spec is A36). My design calculations showed that this would be strong enough and would not deflect significantly under load. One concern was the very fine end of the stationary anvil but this has stood up to the work satisfactorily.

The Maidstone tool has an adjustable stationary set which in my design would not be practical because of the small size required to get access in tight corners so I made the set in the moving anvil adjustable. I had some concerns that the adjustable set would not align very well with the stationary set and cause misformed rivets. Experience has shown that it works well and with a suitably fine pair of sets work in very tight corners.

The stationary anvil location hole in the body is only 1/16" diameter which can be difficult to drill through such a long distance. My approach was to drill the 1/4" punch hole almost to the beginning of the 1/16" hole and then use a long drill 1/16" to finish off. If you don't have a long 1/16" drill a standard jobbers drill may be fitted into a piece of 1/4" dia silver steel using the half and half tang drive method. Concentricity is important and the 4-jaw may be used or the 3-jaw if it is adjustable on its back plate (a poor mans Grip True first described by Prof. Chaddock but probably not his invention). The slot was formed after drilling the anvil holes by cutting up to a previously machined bore. This method helps to give good hole alignment.

The remaining components are simple enough to make and of course the links should be made as pairs by drilling and reaming through both pieces while they are clamped firmly together. Reasonable sliding fits are required in pivot pins and punch holes but they should not be stiff or the tool will be a misery to use. As an experiment I put a spring over the punch to open the tool so that only one-way hand pressure would be required. This works well but occasionally the handle flies wide open, beyond the span of my hand, which is annoying but avoidable with care.

Once I had made the deep throat rivet set I was reminded of the Tucker rivet company's foot operated tubular rivet setting machine which was advertised many years ago. The deep throat version would lend itself to such an arrangement which has the obvious advantage of leaving both hands free to hold the components. A heavier version would also allow its use in setting rivets in boilers and similar thicker plate.

(In the next issue we will make a special rivet tool which will reach those places where these two can't)

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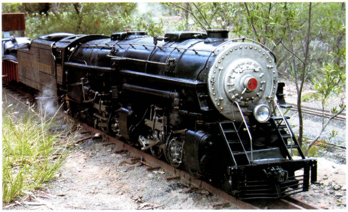
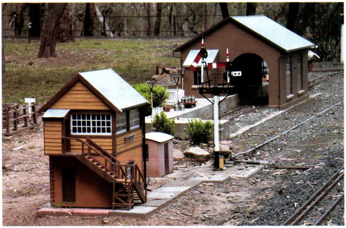
Galston Valley Railway

Hornsby Model Engineers' 29th annual invitation run

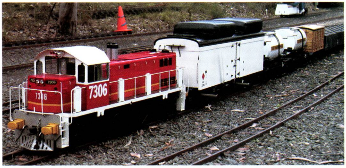
Digital images by David Proctor



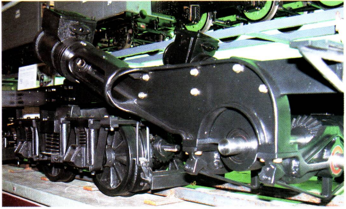
A Norfolk & Western Mallet simmers quietly in a passing loop



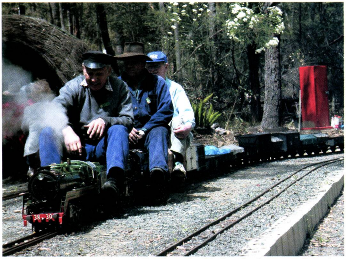
You don't see many 5" railways with this sort of detail in the sidings



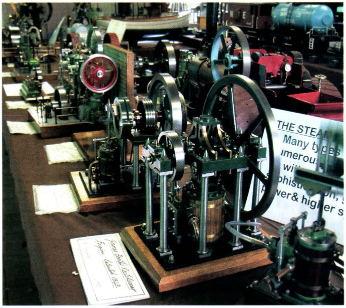
John Wood's 73 class with a train of scale freight stock is always a popular sight at the Galston Valley Railway



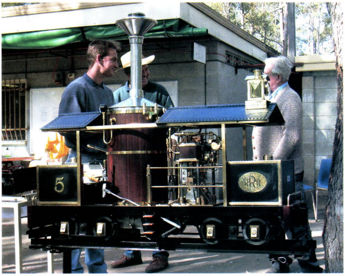
Darin O'Brien's Climax promises to be magnificent when complete



John A'Beckett and Roger Kershaw double head a long goods train

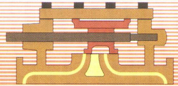


Just a small part of this years model engineering display



Bob Rottenbury (right) discusses the finer points of his new Clishay

Steam Chest



with Dave Harper

Hi there, steam fans, and welcome to another selection of secretions from the steam chest. First up, some model pictures as promised last time!

An antique oscillator

Jonathan Milne-Fowler sent us the following notes and pictures several months ago, but only now have I had space to include them. Apologies, Jonathan, but better late than never! Jonathan's title for this little story is *A Vintage Steam Engine, and a Cautionary Tale.*

"The little steam engine shown in **photos 1 and 2** was built by Ernie Mann about 1927 when he was 15 years of age. It was inherited by his grandson, David Mann, when Ernie died early in 2001 and I was asked if I could connect it to a steam supply so it could run as it did originally. I understand that it was initially used in a model boat of which I have no details, but it had more recently been mounted on a chipboard base and run on compressed air for display.

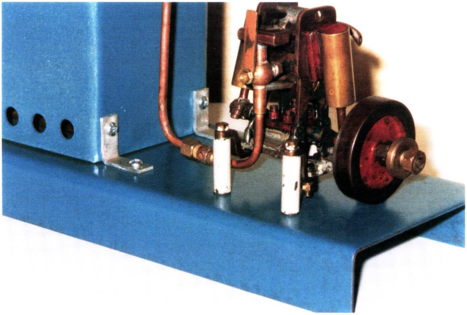


Photo 1

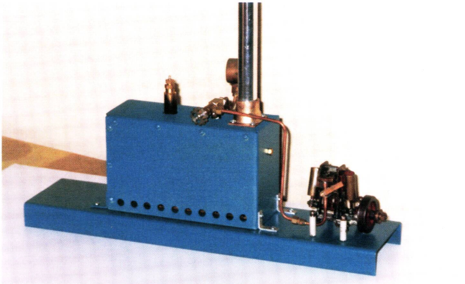


Photo 2

The engine's vital statistics are: -

Vertical twin-cylinder single acting oscillator with a bore and stroke of 10 x 16mm. Cranks disposed at 180 degrees. The overall length is 82mm, width over bearers 61mm and height 67mm. The flywheel is 37.3mm diameter, the rim is 8mm wide and 5.5mm deep. Drive was by a Vee pulley 14.6mm in dia. Both the flywheel and pulley are secured to the crankshaft with threaded split collets.

The engine bed is fabricated from several sizes of strip brass soft soldered together and generously tinned to give the appearance of a casting. Minor differences between the two cylinders and their respective standards suggest that they were originally built as separate single cylinder engines and later married to a common crankshaft and bed.

Observant and knowledgeable readers will note that the plug cock type regulator does not display the same patina of age as the rest of the engine, and thereby hangs a tale! When I was endeavouring to test the fit of a steam connection to the inlet end of the plug cock "the thing came orf in me 'and sir" when the soft soldered joint failed under moderate stress. (All right, I was too enthusiastic!) Re-making the soft soldered joint with the aid of a small pencil flame torch seemed simple enough until it was discovered that the body seating for the plug had been filled with a low temperature melting point alloy which ran out before the soft solder flowed. Oops! A new plug cock with similar external dimensions to the original was made, with a solid brass body and a bronze plug. The design and production of this type of fitting has been covered by other writers and I will not intrude on their domain (unless the editor thinks I should).

The boiler chosen to provide the required steam is a simple horizontal pot 2" diameter and 6" long of copper construction, fully enclosed in a folded steel casing. For initial steam trials the fuel used was hexamine tablets (fire lighters) but these have proven to be very dirty, producing a lot of soot. Alternative fuels are alcohol (methylated spirit) or butane gas with suitable burners and this is a field for experimentation. A modified gas soldering torch may be the most convenient solution.

At its first steaming trial with the new boiler in July 2003 the engine ran freely on only a few pounds of steam pressure. In common with other single acting vertical twin cylinder steam engines, vibration at full speed is minimal. Having the cranks disposed at 180° ensures good dynamic balancing."

A spirit burner

I received the following a little later from Jonathan.

"I have just finished drawing the

alcohol burner I made for firing the boiler attached to the Vintage Steam Engine and thought you might like to have the details.

The burner consists of a tray with profiled ends and a roof shaped top which fits over the tray. Construction is of 1mm sheet brass all silver soldered. The tray is filled to a depth of approximately 10mm with ceramic fibre and a piece of stainless steel mesh cut to fit neatly in the tray sits on top of the fibre. The top is held in place by a small copper rivet at each end: the rivets are just pushed into drilled holes and can easily be withdrawn if neccessary for maintenance. Air holes on each side of the sloping roof allow for oxygen to mix with fuel vapour as it rises through the flame slot along the ridge. (See Figure 1).

A charge of approximately 10cc of fuel just covers the steel mesh and burns with a steady flame for about 20 minutes. With the boiler filled to about 75% capacity it takes around 10 minutes to raise steam and then delivers sufficient steam to run the little engine until the fuel is nearly exhausted. Initial lighting in the confined firebox calls for some persistence until a draft up the stack is established. Combustion is complete as is evidenced by the absence of any of the odour often associated with the use of methylated spirit as fuel."

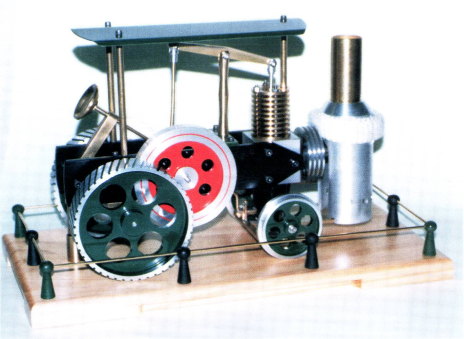


Photo 3

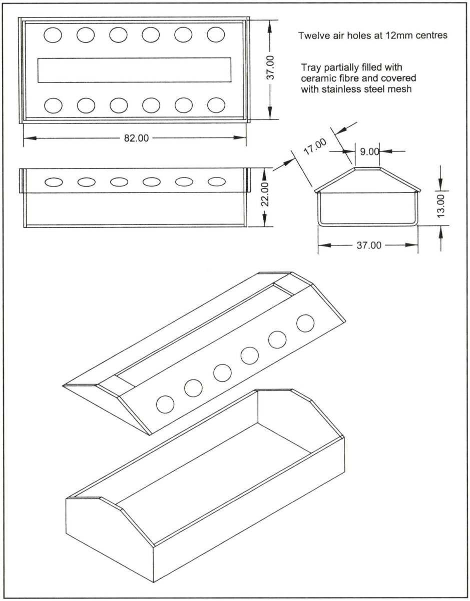

Twelve air holes at 12mm centres
Tray partially filled with ceramic fibre and covered with stainless steel mesh
37.00
82.00
22.00
17.00
9.00
13.00
37.00

Figure 1

The latest from Edwyn Jones

Edwyn recently sent me a picture of his latest hot-air creation, a beam engine powered traction engine no less! See **photo 3**. This model combines his proven hot air beam engine with a neat little drive assembly using nylon gears to make up into a very different but attractive model. The kit comes complete with wooden base which holds the model just far enough up to allow the wheels to turn freely.

The aluminium flywheel is 90mm dia and the whole model is 120mm wide x 290mm long x 200mm high.

Observant readers of the last issue would have noted that kits for this model are available from Minitech or direct from Edwyn. A really neat and different model — good one, Edwyn!

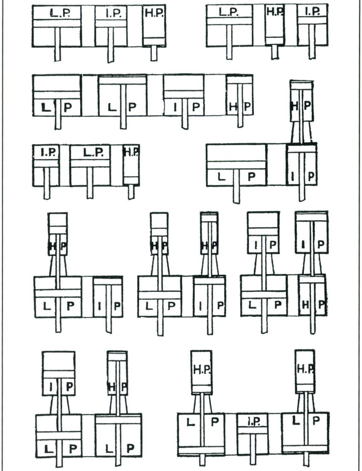
More on *Mary Ann*

Just to help my bulging files along, our editor David Proctor has sent me a sheaf of newspaper clippings and notes on the history of the first steam loco in Maryborough, as featured in my article in the last issue, *Maryborough Revisited*. If anybody would like copies of these notes, I'll be happy to send you a set if you'll send me a large SSAE.

Proportions of steam cylinders

Following the notes on compound and triple expansion steam engines in this column (Issue No. 108, May/June 2003) the question was raised — how were the proportions of the cylinder volumes decided? This led me on an interesting search through my old engineering books! Most books aimed at engine operators

Arrangements of Cylinders in Vertical Triple Expansion Marine Engines.—



H.P. = high-pressure cylinder. *I.P.* = intermediate pressure cylinder.
L.P. = low-pressure cylinder.

Figure 2

don't touch on such things, naturally enough, so I then went through the numerous old engineering yearbooks I've collected, lo and behold! I found three references, in *Low's Pocket Book for Mechanical Engineers* for 1927, *Hutton's Practical Engineer's Handbook* published in 1902, and in the *Mechanical World Yearbook for 1933*. Interestingly, the *Mechanical World Yearbook for 1939* makes no mention of the subject, showing how steam engines were becoming less important at that time.

In common with most questions about steam engines, the answer seems to be — it all depends! *Mechanical World* gives the most concise summary, as follows.

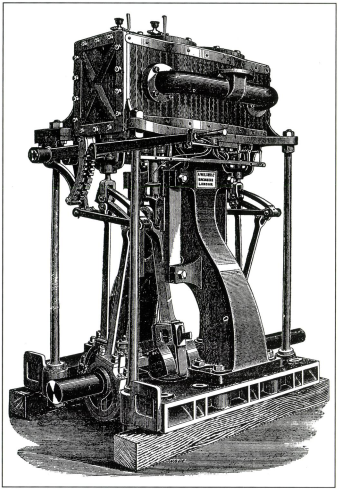


Figure 3

The usual range of cylinder ratios is as follows:- Compounds LP (low pressure) to HP (high pressure) $2^{1}/_{4}$ to 3 non-condensing, 3 to $4^{1}/_{2}$ condensing. Triples LP to HP 5 to $7^{1}/_{2}$, LP to IP (intermediate pressure) or IP to HP 2 to 3, all condensing. The ratio of cylinders and cut-off in the HP cylinder have an influence on the total power developed, whereas the cut-off in the remaining cylinder or cylinders regulates the distribution of power throughout the whole engine.

And so on and so on — there are pages of formulae and many tables giving examples from various engines, far more than I can fit in here! However, if any readers would like a copy of the whole collection of extracts, which runs to 12 A4

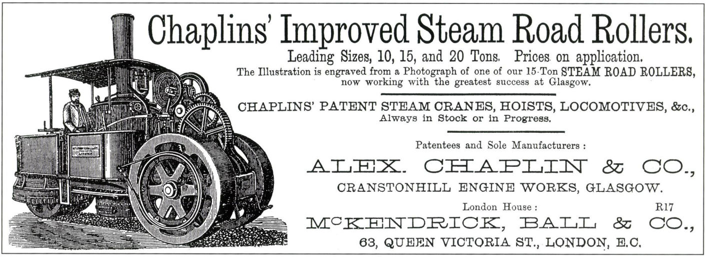


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Figure 4

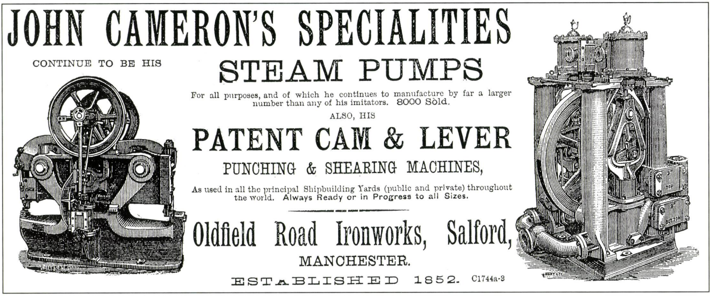
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Figure 5

pages, I'd be happy to supply if you care to supply a SSAE — all part of the service!

Just to show how many variations on a marine engine theme there can be, check out **figure 2** — how many of those have been modelled, I wonder?

Guilty as charged!

One of the problems with having such a large collection of papers and books, etc. is that it's rather easy to overlook something — in preparation for this column I pulled out a large padded envelope and found to my chagrin that it contained some stuff that was sent to me late last year, which I haven't mentioned yet!

Gerry Pentland had emailed me asking if I would be interested in copies of some old *Engineer* magazines that he had acquired. Naturally I was, and said big envelope duly arrived. Comprising no less than 80 A3 sheets, the package comes from *The Engineer* dated 1879 and 1882, five different issues! Many of the engravings in the advertisements are real eye-openers, showing steam engines way different to the usual run of things! I'll include a few in the column to whet your appetite, but if anyone would like the whole set, I reckon $20 would cover the copying and postage costs. This is the main reason I collect these old publications, so I can share them with you, our readers. I feel that's the reason why people like Gerry pass them on to me in the first place, so I have an obligation! Luckily we have a good self-service copy shop nearby, so it really is no problem — here are some samples:-

Figure 3 is a quite different marine engine, with a central casting carrying the crosshead guides back-to-back and columns at the outer corners. These were produced by Alex Wilson & Co. at the famous Vauxhall Ironworks in London.

Figure 4 is a very unusual style of road roller by Alex. Chaplin — the one in the illustration is the 15 ton job, they also came in 10 and 20 ton models.

Finally, **Figure 5** is one of THOSE pumps that was the subject of discussion a couple of issues ago! The original Cameron pump no less.

Sorry it's taken so long Gerry, glad I finally found it!

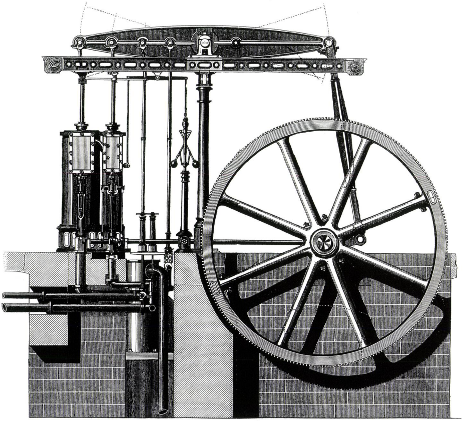


Figure 6

My favourite *Engineer*

This seems a good time to mention my favourite book, a bound copy of *The Engineer* covering the first six months of 1867 — another find that a reader put me on to! This volume has many engravings of machines that were shown in the Great Exhibition in Paris in 1867, which is probably why this valuable volume survived — anyway, I extracted 40 A3 sheets of these beautiful drawings, and have sent many sets out for a mere $10 (they are still available) as an example of the great engravings in this set, how about **figure 6** — a compound beam engine by MM Carels of Ghent. Fancy setting that up for an exhibition, even if it did run for six months!

That seems to be about enough for this time, until next time, happy steaming!

Dave's email address is: sandave@bytesite.com.au

Traction Action

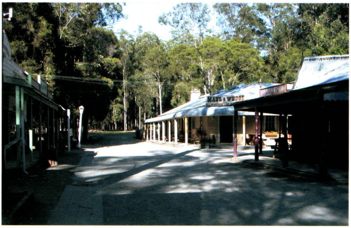
15th Australian Miniatur

at Timbertown, Waucho

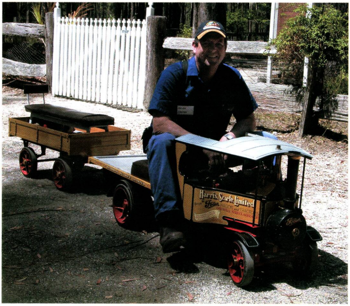
By Da

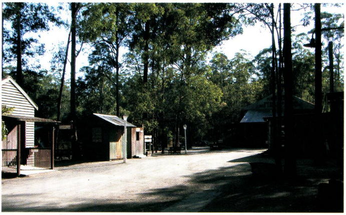
Could there be a better place to hold a miniature traction engine rally? I think it would be hard to find one!

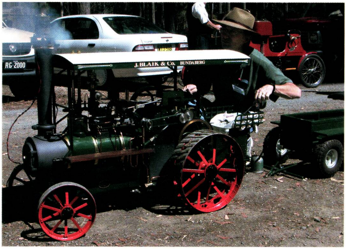
Timbertown is a tourist complex on the western edge of the town of Wauchope on the mid north coast of New South Wales. As the name suggests the whole site is a showcase of various aspects of the timber industry from days gone by, with such features as a 2 foot gauge railway, a steam powered saw mill, various static exhibits and remains, a period working small town and live shows, plus much more. The setting really is in the bush and the first thing which strikes one on arrival is the great height and perfectly straight trunks on all the trees, which are everywhere. No wonder the main industry here was timber cutting.

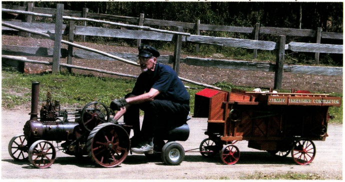

Looking west along the main street of Timbertown early morning

Another early morning street scene, before the public arrive


AME's Advertising Manager, Brian Carter is very partial to Foden wagons and looks forward to the day when his is finished. Here he enjoys a drive of Martin Yule's newest toy built by Brian Niesche


Looking east along the main street towards the sawmill


Still looking new — John Blaik from Bundaberg lights up his nicely finished 3" Cliff & Bunting, ready for a busy Saturday.


Joe Timkiv from Brisbane hauls his 3" Ransomes thresher behind his yet to be painted Durham & North Yorkshire engine

raction Engine & Road Steam Rally

W 17 — 19 October 2003

ctor

Col Jones and I drove up from Canberra, arriving around 4 o'clock on the Friday afternoon. After checking into our accommodation, right next door, we then ventured down a dirt road into the bush behind the Timbertown tourist complex, until we came to the location amongst the trees where people were already steaming their engines and some had set up camp. After unloading Col's Allchin and associated gear there was time to socialise and enjoy a drink until the evening BBQ was ready.

Saturday

Our hosts for the weekend were the Timbertown Steam & Oil Engine Club and the Timbertown Miniature Railway, both of whom share the club house which was the venue for a very nice breakfast both Saturday and Sunday. After breakfast was out of the way it was time to steam up and go exploring the site. With the instruction that we could go wherever we liked on the property, it soon became apparent that there were all sorts of bush tracks and roads to explore, some short and some long enough to require a cut lunch!

The main focus for several drivers was the town itself, based primarily around two main cross-streets with a few others running off here and there. The steam saw mill is at the bottom end of the main street and the town oval is at the other end with lots of old shops, blacksmith, furniture maker, restaurant, etc. in

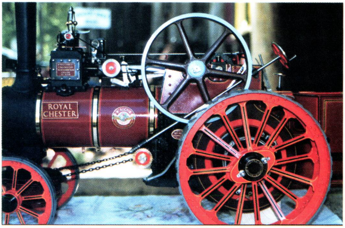
John and Phyl Oliver head to town on John's freelance engine

Bob White's traction engine was one of seven 3" scale Cliff & Buntings in attendance this year.

Col Jones from Canberra with his 3" Allchin on the track around the outside of the oval before lining up for a group photo.

These two locos on the 2-foot railway are extras to the Fowler.

Mike New's Fowler showman's engine is always a colourful sight



The finish on Ken Preiss' $1^1/_2$" Allchin is outstanding

John Levers "cruises" the main street on his 3" Buffalo Pitts

You can see Kevin Hyde enjoys driving his Stanley Steamer

The impressive line-up on the oval after Saturday's grand parade

between, all working. At around 11:30 am everyone assembled in the area adjacent to the saw mill, waiting for the bullock team to finish a display, before doing a grand parade up to the oval. The atmosphere and the sight of the steamers in this period setting was fantastic.

After the grand parade the afternoon was spent running here, there and everywhere, along with some socializing, and stopping to talk to tourists and workers in the town. There certainly was no shortage of people wanting to ask questions. The weather over the weekend was quite warm so the ice cream shop did a roaring trade. As it got towards evening, the engines were put away and most of the rally-goers boarded the 2-foot gauge train for a free ride around Timbertown before adjourning to the Maul and Wedge Restaurant for a very nice evening meal. This was followed by a small gathering around a "spinfire". Peter Smith made a brazier using the spin tub from an old twin tub washing machine (well, we assume it was an old one, Denise), which worked really well, hence the "spinfire".

Sunday

Sunday was basically a repeat of Saturday though a few more drivers ventured further into the bush to explore the place after breakfast and the meeting to decide future venues. It was decided that

2004 will be at Lake Macquarie LSLS, Edgeworth, NSW and

John Sparks and Ted Rockett watch Dave Watkins on his 4" Foden

Ross Grunwald drives his 3" Cliff & Bunting around the oval

Yet another 3" Cliff & Bunting, this one belonging to Wayne Anderson

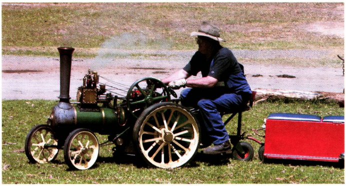
2005 will be at the traditional venue at Inverell, NSW.

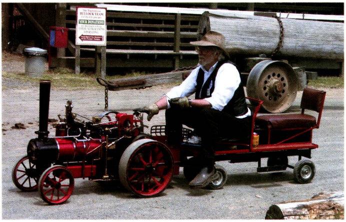
Proposals have also been received from Mannum (SA) and Horsham (Vic).

Again there was a grand parade along the main street from the sawmill to the oval, where it was my pleasant duty to present the **AME Traction Action Trophy** to Jim Mitchell of Canberra, who scored the most votes for his brand new 3" Burrell compound engine (see front cover). Well done, Jim!

After the presentation I was given a footplate ride on the 2-foot gauge loco, a Fowler 0-4-2T, with the one-man crew of Dave (easy name to remember). The track is an interesting one somewhere between 2 and 3 kilometers long with several grades of 1 in 40 and tight curves — just what narrow gauge people dream about. The feature I found most interesting was a long S-shaped trestle bridge which starts on a curve, has a reverse curve in the middle and starts a 1 in 40 grade well before the end.

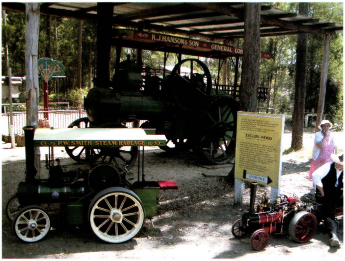
All too soon, the day was drawing to a close and it was time to start packing up and prepare for an early departure for home the next day. A special thanks to Paul and Susan Stanley, Ian Strawbridge and all the others who put in such a great effort to ensure we all enjoyed one of the best weekends ever. We'll be back!


Turning into the oval is Gordon Blake and his 4$^{1}/_{2}$" Burrell

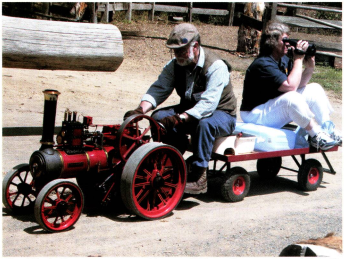


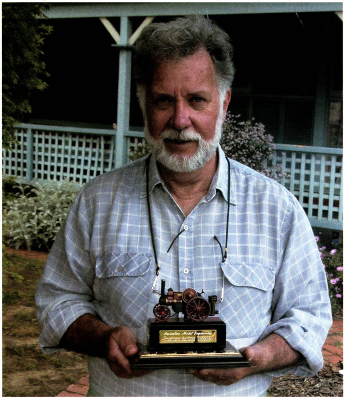
Adrian Robinson passes the bullock wagon on his 3" Cliff & Bunting

The entrance to the Timbertown Miniature Railway compound



Peter Smiths Ransomes road locomotive and Adrian Robinson's Cliff & Bunting wait for the parade in front of a much larger Fowler


Jim Mitchell concentrates on his new 3" Burrell compound while wife Margaret records the action in the oval after the grand parade



A still surprised Jim Mitchell holds the well-earned AME trophy

A Small Weir Type Stationary Boiler Feed Pump, circa 1885 — part 4

by Peter Lukey

Drawings for publication from author's originals by Peter Manning, photos by Brian Carter unless otherwise credited

Note — all photos in this instalment are self explanatory and show various stages of assembly

Assembly and setting

Clean all the parts down to ensure no machining chips are left in the ports and passages.

Fit the bottom cover to the steam cylinder with a 1/64" gasket. Fill in the countersunk screw heads with Plastibond® and sand flush.

Fit a Viton A® 'O' ring to the steam piston. Apply some 'O' ring or other silicone grease and insert the piston rod and steam piston into the cylinder. Pack the steam cylinder gland with your favourite packing (mine is Grafoil® ribbon packing). Fit the two tie rods to the lower steam cylinder flange and check that everything lines up. The piston rod should move evenly but a bit stiffly.

Push the main crosshead onto the piston rod, with the crosshead pin boss upwards.

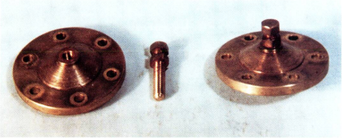
Slide the pump top cover onto the piston rod and pack the gland. Leave the glands quite loose at present.

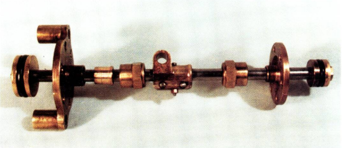
Fit the pump bucket to the piston rod and do the retaining nut up as tight as possible, holding the bucket with the fingers only.

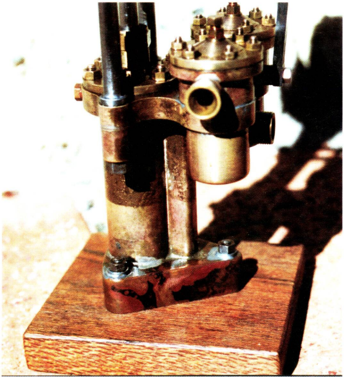
Turn your attention now to the pump assembly.

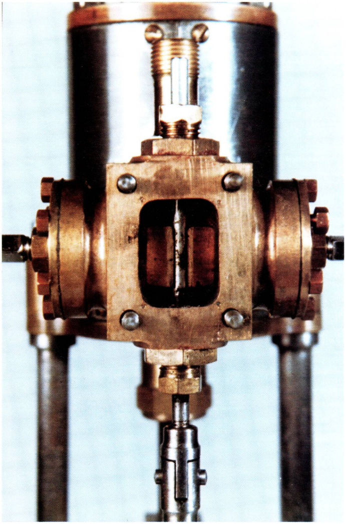
Seat 1/4" balls onto their seats. Fit the 1 mm section Buna N® 'O' rings to the valve seat grooves putting just a touch of 'O' ring grease on the 'O' rings. Stack the seats and valves into each valve body. Finally make valve body cover joints of 1/64" thickness and fit the covers. Adjust the clamp bolts to just hold the valve seats down and tighten the locknut.

Fit the Buna N 'O' ring to the pump bucket and slide the pump assembly with a 1/64" cover gasket over the pump bucket. Push the tie bolts through the pump top flange. Fit the tie rod nuts and tighten up. Fit the pump top cover to the pump flange. Check for









binding or uneven stiffness when moving the piston rod up and down and rotating it. If tight, disassemble the parts one at a time until the misalignment is found and rectify the problem.

To set the crosshead in place, assemble the front stay by the lower mounting pad only.

Centralise the steam piston in the steam cylinder by measurement (the top cover should not be fitted yet). Using a surface gauge, set the crosshead pin centre by moving the crosshead up or down on the piston rod, on the horizontal centreline of the valve gear lever pivot point in the front stay. Remove the front stay. Drill the main crosshead and piston rod through and ream for a no. 5/0 taper pin. Fit a pin with a draw in nut on the 'clamp lug' side of the main crosshead.

Remove the valve assembly from its wrapper and fit $^{1}/_{64}$" gaskets to the shuttle end covers. Seal the pilot valve gland covers with Stag® or similar sealer. Pack the valve rod glands.

Fit the steam chest to the cylinder port block with a $^{1}/_{64}$" gasket. Leave the steam chest cover off at this stage.

Fit the valve spindle to the pilot valve spindle ensuring the valve spindle joint is in the right direction. Leave the lower locknuts off the lower valve spindle.

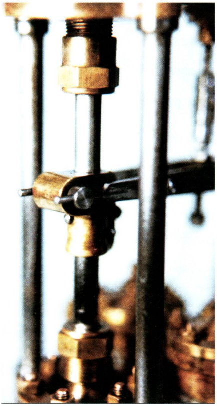
Fit the valve gear levers with the spacers and the valve spindle crosshead then fit the assembly to the bush in the front stay. Slide the valve gear lever pins into the main crosshead pin (in the crosshead) and the lower valve spindle into the valve crosshead.

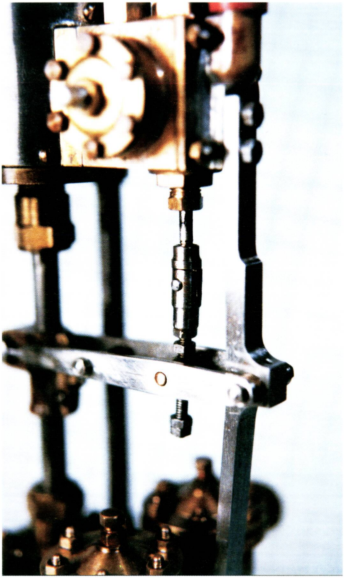
Secure the front stay to the pump pad and align the stay vertically.

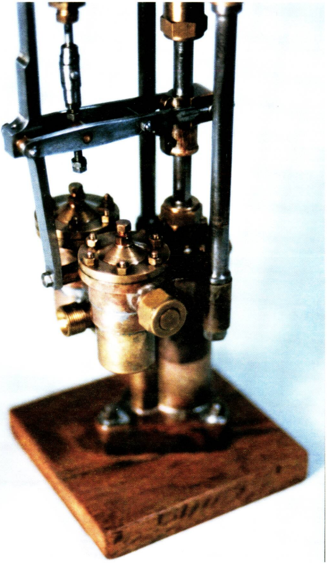
Push the main crosshead up $^{9}/_{16}$" from centre, measuring this in the steam cylinder. Adjust the lower valve spindle until the lower pilot port in the shuttle can just be seen. Tighten the locknut under the valve spindle joint.

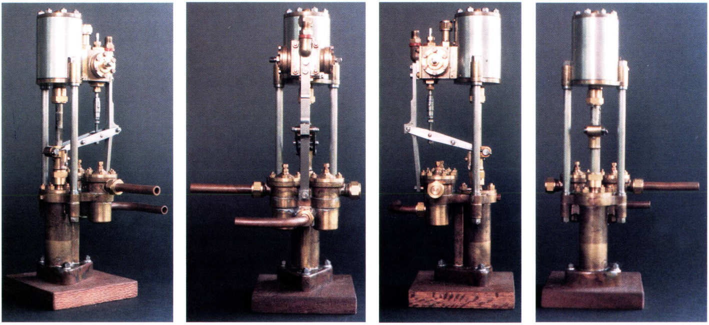
Push the main crosshead pin down $^{9}/_{16}$" from the centre. Put the lower locknuts onto the lower spindle and adjust them up until the upper pilot port in the shuttle can just be seen. Tighten the lower lock nuts.

Measure the distance between the striking faces of the locknuts on the lower valve spindle. Remove the lower locknuts and remove the front stay complete with the valve gear levers.








These four views show each side of the author's completed pump Photos: Peter Lukey

Fit the steam chest and top steam cylinder covers with 1/64" gaskets, then replace the front stay again, sliding the valve gear lever pins and the lower valve spindle into place. Secure the front stay with all three (3) bolts. Refit the lower locknuts at the measurement taken before.

Using a spanner on the main crosshead tighten the pump bucket nut with a tube spanner inserted through the pump base. Finally, push the piston rod down to the bottom of the stroke and measure from the pump bottom to the bottom of the pump bucket. Make the bottom plug 1/16" less than the previous measurement and fit with Stag or similar sealer.

The pump is now ready to test on air or steam. Any minor adjustments to the valve setting should be made whilst pumping water. Note that adjustments of the lower valve spindle allows equalising of the end clearances. Adjustment of the lower locknuts will increase or decrease the pump stroke. Adjust these settings until the pump strokes are even in speed, then tighten the locknuts.

Conclusion

The design and construction of this small Weir type boiler feed pump has provided many hours of pleasure and thought, as the original model was built from the spare parts illustration only. The drawings accompanying this article were made after construction. That concludes this short construction article which I hope will inspire others to build a near scale pump for their stationary or marine plant.

'O' RINGS

Steam Piston	VitonA	BS113	3/32"
	or	BS016	1/16"
Pump Bucket	Buna N	BS012	1/16"
Valve Cages	Buna N	OR 14 x 1	1mm section

All are available from Bearing Services but they will probably have to order in the OR 14 x 1's (usual disclaimer).

References

- Reid E C, Renshaw J C: *Steam,* 1988, Cole Publications, S I Edition — esp. p. 495 Fig 25.3
- *The Engineers Handbook to Weir Marine Steam Auxiliaries* — 11th Edition, 1925, E & J Weir Ltd, Glasgow

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Simple Effective Traverser with Hydraulic Lift

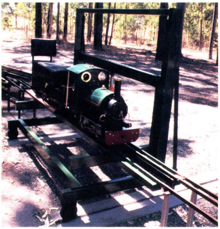
by Kevin Hyde

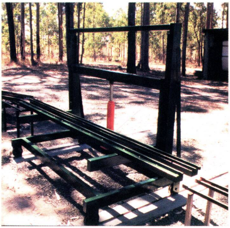
This piece of equipment is the latest improvement installed at Richmond River Mini Railway & Model Engineers Inc. at Ellangowan

Very simple construction starting with the foundation to take the track which comprises a base of 2 strips of concrete 350 x 100mm (length to suit) and 50 x 50 x 3 angle set in the concrete to form a Vee section to take the Vee'd wheels, the tracks set at 1800mm apart.

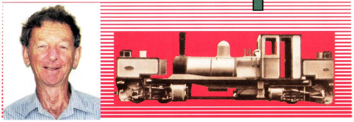
The traverser is constructed of 100 x 50 x 3 RHS with reinforcing of lifting and support beam with 100 x 6 flat steel. The mast is constructed of 100 x 50 x 3 RHS with 20 x 20 solid to form the mast track, solid wheels of 60mm dia. Fitted with bronze bushes to form the mast arms. The wheels are turned to form the Vee'd section out of 150 dia. X 25mm, fitted with 6204zz bearings. Rail line supports are 75 x 50 x 3 x 3000 RHS.

The lifting mechanism is a long series of hydraulic jack (Hare & Forbes) which enables traverser to be set 450mm from ground to raised height of 950mm. The traverser works very well, enabling easy unloading and loading of very heavy locomotives with little effort (it has easily handled a loco weighing in excess of 750kg).





Garratt Gossip



with John Cummings

Last year I received some email which was addressed to me as *The Guru Garratts*. Please do not think that is what I am — I am definitely not. When I started this column with previous Editor Brian Carter's support, my idea was to be a central collection point for Garratt information and that is what this column is all about (plus the occasional bit of frivolity). What I have learnt about Garratts is with your help. You would be surprised just how much international mail I receive — from The Netherlands, UK, USA, New Zealand and South Africa.

Can you help?

Now a question which I hope some reader can answer. Last year I received two enquiries about superheater elements in relation to what is the ratio between the flue tubes and super heater elements? Does anyone know if such a formula exists? I have done some research, but so far no luck. If you do know then please let us at *AME* know.

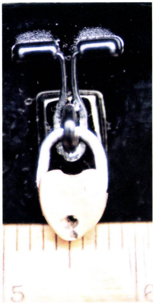
Some super-detail

Last year I received a letter from Warren Starr with photos of the latest detail that he has put on his AD60 class Garratt. In case you do not recognize it from the photos it is a working padlock on the toolbox. Beautiful isn't it!

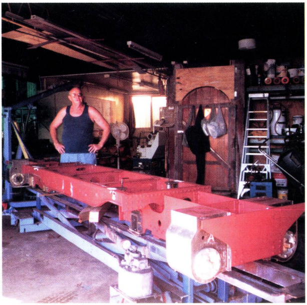
A diesel Garratt

Readers will recall that in *GG*, issue #110 I wondered about the possibility of Wayne Roberts building a diesel Garratt. Well, I have received a letter and photos from Lyle James, the owner/builder of that diesel Garratt I mentioned. It's named *CLAYTON* and this is what Lyle writes about it.

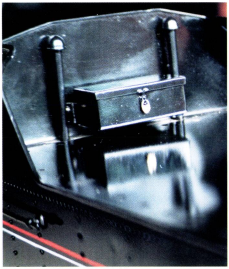
"Love it or hate it, it does exist and has proved itself to be very popular and reliable. Many have been puzzled as they look for the familiar steam and smoke. During the recent summer bush fire bans *CLAYTON* proved itself invaluable to the club, pulling hundreds of people and enabling the club to meet its obligations to the public."

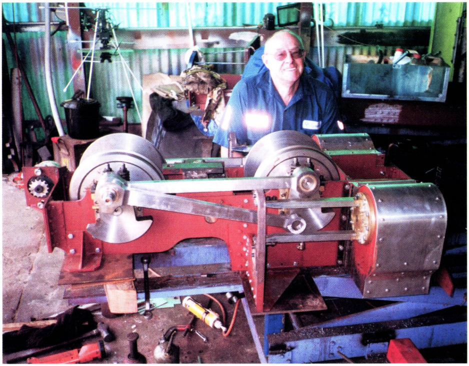


A working padlock



Lyle with the rather large chassis of CLAYTON





Lyle with a smile during the building of CLAYTON

Clayton is ready for the road Photo: Grahame Swanson

You would never know it isn't a steamer! Photo: G. Swanson

It's comfortable to drive, low maintenance, has the appearance of a Darjeeling Garratt and Lyle loves it. **Technical details are**:

- Wheel arrangement: 0-4-0+0-4-0 (loosely based on the Darjeeling Garratt)
- Length: 14ft
- Width: 27 inches
- Power: 3 cyl Yanmar diesel, 21HP
- Drive: hydraulic to all wheels

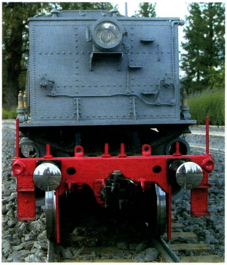
Constructed from a combination of steel, aluminium and fiberglass. An electric vacuum pump supplies power for the train brakes while air for the whistle is supplied by an Endless Air Supply compressor driven from the diesel motor. It took 12 months to construct with the assistance of Ken Howell.

That North American Garratt

While on the subject of Lyle, you may recall that Trevor Heath in the USA bought a NSW AD60 Garratt which Lyle started many years ago. Trevor has been sending us shots of its progress and these are his latest ones.

Now I will sign off and wish you all a belated happy constructive New Year and don't forget your photos and stories which I need to keep this column going.

You can email John on:
jandpcum@pnc.com.au



Bremme Valve Gear

by John Cummings

Drawing by Dave Adams

How many readers have heard of or know about Bremme valve gear?

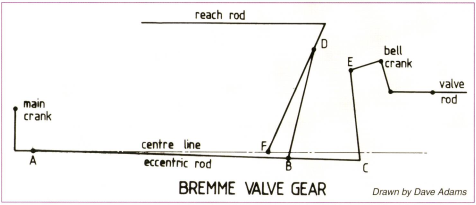
My interest in this valve gear came about sometime in the late 1990s when I was given some old *Model Engineers* from the 1970s. Whilst reading through them I saw this article titled *A Locomotive With Bremme Valve Gear.* The photographs of this particular freelance loco with this valve gear rang bells.

When I originally built my NSW C35 class I decided to make and fit Southern valve gear to it. Why, you may ask! Well, as an apprentice fitter in the NSW Government Railways I had worked on the D55 class locos which were fitted with Southern valve gear and I found it to be an interesting valve gear.

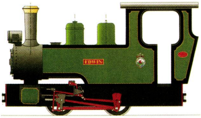
As I had no dimensional drawings to work from I copied my railway technical books, not realising that because the D55 cylinders were horizontal and the C35 ones were inclined, that this would alter the valve timing/setting. This mistake did not show up when running on air BUT the moment steam got into the act that was a different story. It gave the loco the hiccups (because that is what it sounded like when running) and no matter what I did it would not cure the hiccups. Well, it took the late Arthur Sherwood to sort out the problem. He then drew up for me what I called at the time "Southern/ Sherwood Valve Gear". It was not until I was given these old issues of *Model Engineer* (January 1973 pages 31-33) and read this article that I realized that what Arthur Sherwood had drawn for me was actually Bremme valve gear.

While I was writing this article a friend called in and asked whether I was writing another *Garratt Gossip* for *AME.* When I said no and told him what I was doing, he then proceeded to ask questions about this Bremme valve gear, so I photocopied the original and gave it to him. When I called in some weeks later I found him sitting at his computer quite excited because he had found a web site with all valve gears on it, including Bremme. It was while looking at this page I noticed that the title was written as Bremme/Klug. Bells started ringing again. Some years ago Geoff Murdoch had written an article on Klug valve gear (*AME* #76, page 19) and in a later issue Jon Milne-Fowler had written saying that Marshall and Klug were the same (*AME* #78, page 45).

I found that Bremme valve gear was simple to make as it doesn't require a curved expansion link like Walschaerts or Southern have. Yes, there are disadvantages in these valve gears as Geoff Murdoch says in his article, but I think that it doesn't really matter — it works and that's the main thing! Interesting subject isn't it? Should you wish to check out this web site it is at www.tcsn.net/charlied/



EDWIN



A freelance Fowler style 0-4-0 tank locomotive in 16mm scale for 32 and 45mm gauge

by Brian Wilson

Drawings and photos by the author unless otherwise indicated

Part 5

Boiler

As far as boilers go, this one is quite basic. It is gas fired, with one flue tube. A boiler of this size and working pressure is below the minimum size covered by the AMBSC code. Where appropriate, however, its features are designed in excess of the code. Before making it, you should verify the design with a club boiler inspector or appropriate authority, and make sure that you fully understand all of the requirements of making and using a model boiler. The materials used should satisfy the requirements specified in the AMBSC code for building copper boilers, and the manufacturer's instructions with regard to the materials and equipment used to make the boiler must be thoroughly understood and followed during construction. Care must be taken and appropriate precautions followed when using acid pickle to clean the copper. The steps of construction outlined here are suggestions only and it is the builders responsibility to make sure that the steps are thoroughly understood, taken in a safe order and are within his or her ability to carry out.

For boiler making you will need a heating source, the most ideal for a small boiler being an air/propane torch with pinpoint, medium and large tips as mentioned in the introduction. An acid pickle will be needed and commonly dilute sulphuric acid has been used. A cheaper and safer alternative is citric acid, obtainable from the Home Brew shop. You may need to leave the job in the pickle bath a little longer, but the benefits are worth this inconvenience.

Cut and prepare all the materials and turn the bushes for the safety valve, steam manifold and steam dome from bronze. (**See photo 6**) The sizes given here will need to be checked and if necessary, adjustments made to suit your materials. The material obtained for the tube plates was Imperial size, so was $^{1}/_{16}$" thick. Two discs 52mm diameter are required. A hardwood or steel former needs to be turned up to a diameter of 36.8mm (1.450") with a 1.5mm radius on the edge. The discs are now annealed by heating to red heat and quenching in water. Grip between the former and a block of hard material and with a soft-faced hammer, start turning the edge over the former (**See photo 7**). As soon as the work starts to become hard, anneal again, clamp over the former and hammer. Repeat the process until the copper is folded snugly onto the former. The tube plates should be a neat sliding fit in the barrel, not so tight that solder is unable to flow and not so loose that a large gap has to be filled. Next drill the 16mm holes in the tube plates for the flue tube. The flue needs to be as low down in the boiler as possible so the hole will be drilled so that it just clears the inside of the flange we have just made without interfering too much with the radius on the edge. Turn up a hardwood block (the one can be used twice) about 15mm or so thick to a diameter of about 37mm so that it is a snug fit inside the back of the tube plate. Mark a centre line across it and mark the position of a 16mm hole (to match your flue tube), to leave about 1.5mm clearance at the edge. (It will be about 10mm out from the centre). Clamp the tube plate onto a block of hardwood on the drill press table, so that it is sandwiched between the two pieces of wood and drill through with a 16mm drill. Repeat for the other tube plate, turning the block around, to present a new spot for the hole.

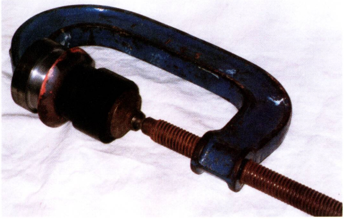


Photo 7

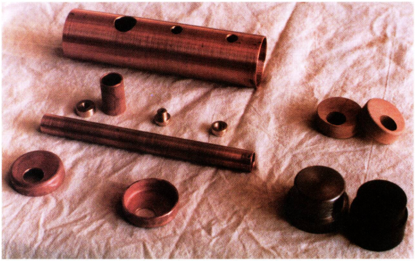


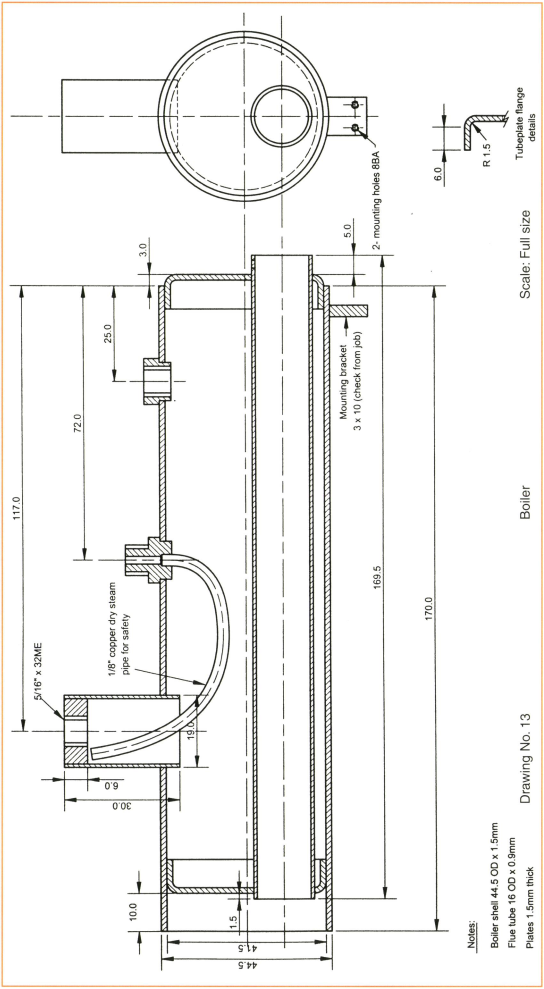
Photo 6

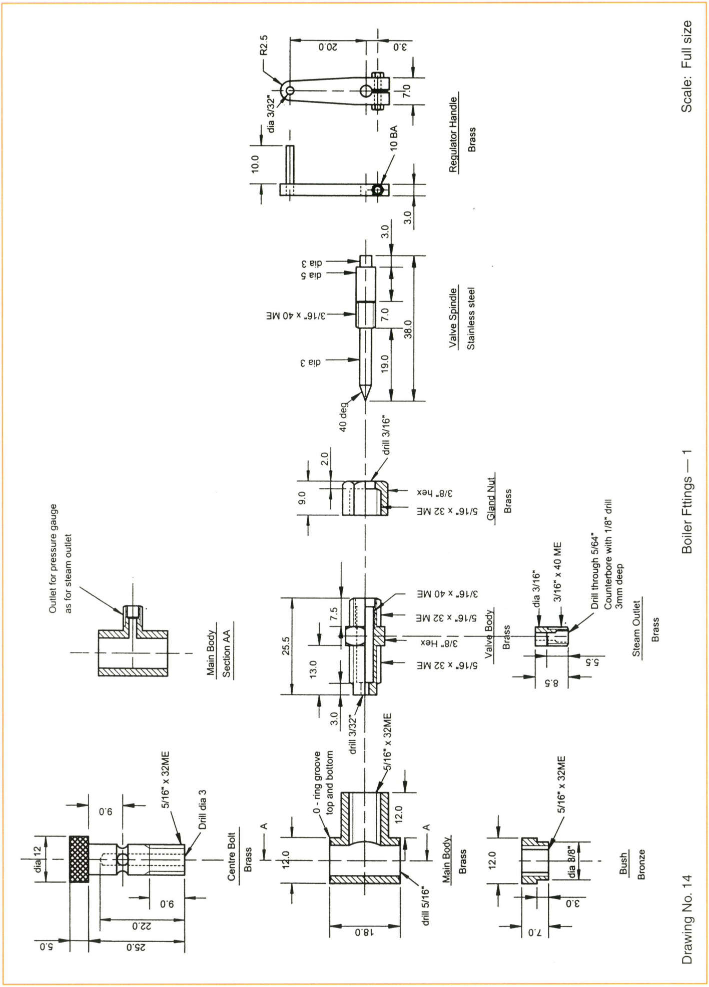
The boiler is now ready for soldering, but first let us mention a few basic principles, which may help to produce a good result. Firstly, the joints to be soldered should be a good fit and be adequately supported. There is nothing much worse than being halfway through a soldering job when the heat expands or moves the pieces and everything collapses, or worse, slips and solders itself out of position. Secondly, the joints to be soldered must be clean and well fluxed, and thirdly, adequate heat must be applied to enable the solder to flow freely, but not so much that the joint becomes overheated. The AMBSC Code for building copper boilers states the grades of silver brazing alloy which are permitted to be used in copper boiler making. We can use a solder containing 45% silver throughout. When heating at any stage, always apply flux to previously soldered joints. The suggested sequence of heating stages is:

1. The dry steam pipe to the safety valve bush.
2. Flue tube into the front tube plate.
3. Front tube plate into the barrel.

4. Back tube plate and the flue tube.
5. The bushes and the steam dome.

1. It is a good idea to solder this pipe in first to avoid the possibility of forgetting it later. Bend the dry pipe to match the drawing, it can be adjusted to fit into the dome out of the way of the filler plug later. Apply flux, solder and pickle, and put to one side.
2. Insert the flue tube into the tube plate and apply flux to both sides. Mount the front tube plate up on bricks, with the flue tube placed in position hanging downwards and supported underneath. Make sure the tube is perpendicular to the tube plate, although the copper will be soft enough to allow some adjustment later. Cut short lengths of solder rod about 3-4mm long and place around the joint as well as having a stick of solder to feed into the joint as necessary. You must apply sufficient solder to completely fill the joint. (Don't even start to think about the price of silver solder as the joint hungrily consumes it!) Place in pickle and thoroughly clean.
3. Slide the front tube plate with the flue tube attached into the front of the barrel for the required distance, and with the tube positioned at the bottom of the barrel. The fit should be tight enough to support the pieces, if not you can bend the flange out a little until it is quite firm. At the back end, slide the rear tube plate over the flue tube and push it so that it only just enters the barrel. This is to hold the flue tube in the correct position, but do NOT push the rear plate right in or you will never get it out later. Support the job so that nothing is able to move when heat is applied or if you give it a slight bump when feeding the solder in. Apply flux liberally to the joint and also to the previously soldered joint. Cut pieces of solder around the joint and heat. A lot more heat will be required this time, as we have to heat up the





Drawing No. 14

Boiler Fttings — 1

Scale: Full size

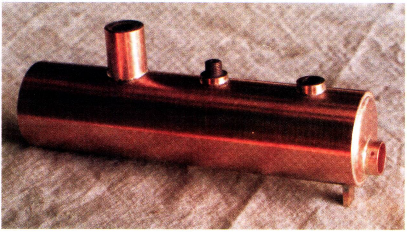


Photo 8

Photo 9

barrel as well. Remember that there must be sufficient heat for the solder to flow freely. When things are going well, the pieces of solder placed around the joint will disappear and you will be feeding in solder so that it seems as if the joint is actually sucking it in. Stop heating when the joint is full all the way around and pickle to clean.

4. Slide off the rear tube plate and after cleaning, thoroughly examine the joint you have just soldered to see that there is complete penetration. If everything appears as it should, then apply flux to the rear tube plate and flue tube and also the previously soldered joints. Slide the tube plate into position and solder in place. Again pickle and clean.
5. Finally, solder in the steam dome and bushes. It might be a good idea to solder in the bush for the filler plug before doing this, but provided it is firm in the ¾" tube, it can be soldered at the same time as the other bushes.

Clean the boiler up with steel wool to remove any flux residue and generally spruce things up. (**See photos 8 and 9**). The mounting bracket can be fixed on later using high melting point soft solder. (i.e. the soft solder which has a small silver content).

Now would be a good time to cold water test your boiler to 700kpa. This should be done in consultation with a club boiler inspector.

As the outside diameter of our boiler is about 42mm and we want the boiler cladding to match the 50mm diameter of the smokebox, we can soft solder some rings onto the barrel to provide a landing for the cladding. Cut some strips about 4 or 5mm wide from some 1.5mm copper left over from the tube plate material, and bend them so that they fit snugly around the barrel. They can be lightly clamped on and then soft soldered into place with a spot of solder at the ends (**See photo 10**). Heating the boiler for this will not affect the silver solder.

Boiler fittings

The throttle is largely an exercise in turning and threading. The main body will need to be fabricated from two pieces of 12mm diameter brass, silver soldered together. Grip some 12mm brass in the chuck and drill and tap 5/16" x 32 for a depth of about 20mm. Part off to 18mm. Move the material out from the chuck and part off another 18mm. Take this piece and setting it up in the drill press vice, drill it 12mm diameter in the middle to a depth half way through. The threaded part can then be silver soldered into this hole. Grip the main body back in the 3-jaw chuck and drill through 5/16", using progressively bigger drills and taking care where the drill meets the threaded hole. The main body can be mounted and sealed using 'O' rings, or copper, aluminium or fibre washers. If 'O' rings are used, a groove will need to be turned top and bottom to retain them under pressure. If solid washers are used, the centre bolt would probably be better to have a hexagon rather than a knurled top. When making the valve, the seat should be cleaned up with a 'D'-bit after drilling, to give a good sharp edge for the spindle to seal onto. Take care that the position and length of thread on the spindle allows it to be tightened fully and not bind before closing up properly. When the valve body is screwed into the main body, the steam outlet should be on the right hand side. Fibre washers can be used to adjust this position.

When making the safety valve, the stainless steel spindle can be made with two pieces silver soldered together, or turned from one piece. The spring is wound from stainless wire of .010" diameter and should have 10 coils

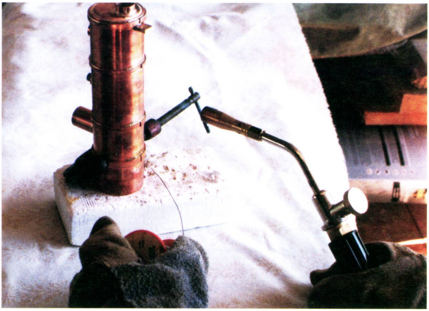
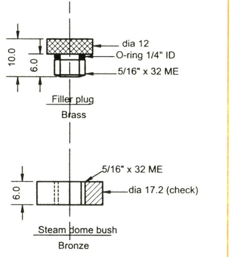
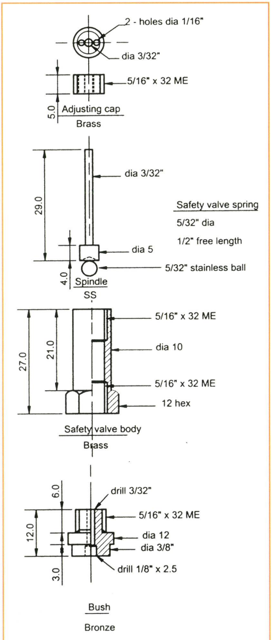


Photo 10



Drawing No. 15 Filler plug Scale: Full Size



Drawing No. 15A Safety Valve Scale: Full size

Photo 11

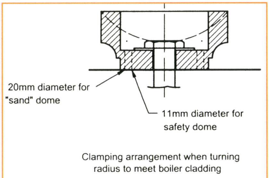
and a free length of 12mm. Place a ball on the seat, (preferably not the one you are going to use), and give it a tap to help it seat properly in use. (This would best be done before soldering into the boiler).

Dome covers

The making of the domes can be simplified by not shaping them where they meet the boiler cladding, but personally I think the extra time spent in doing this is well worth it. They could be made up totally from a solid piece of brass, but we have shown them each made in three parts, the centre bit being a short length of 25mm brass tube. The same method is used to make both dome covers. In a model of this size you could also use the much quicker method of flaring out a length of copper tubing and then shaping it to fit the boiler cladding.

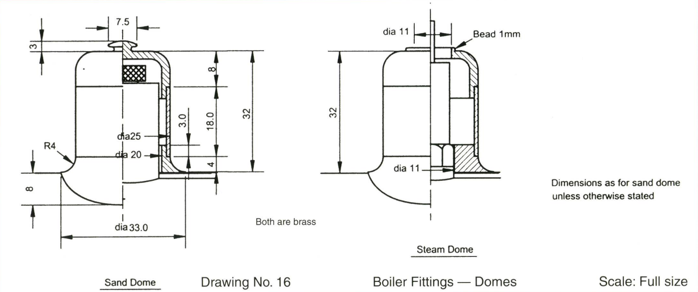
For the top section, grip a length of 25mm diameter brass in the chuck and turn and bore as shown. Part off, reverse in the chuck and shape the end. The cap on top of the sand dome can be shaped by using a small parting tool with rounded shoulders. The bottom section requires a few more operations, so take a length of about 38mm diameter brass and grip in the chuck. Turn to an outside diameter of 33mm and bore through 6mm. Turn the lip to take the brass tube and form the 4mm radius either with a form tool, or by manipulating the two hand wheels. Part off to 15mm long, reverse in the chuck and gripping by the 3mm shoulder, bore out a step (**see diagram 11**), which will be used to clamp the piece for shaping the 50mm radius to fit onto the boiler cladding. The piece can now be set up in the vertical slide or milling machine and the radius bored. Alternatively, the piece may be clamped onto an angle plate mounted on the face plate and bored in the lathe. After turning the radius, return the piece to the chuck and bore out to 20mm for the sand dome and 11mm for the safety valve dome. **Photo 11** shows the dome and chimney bases after this process and before final shaping. Lastly, file the ridge off and blend the radius down to the side of the boiler cladding.

To be continued ...



Clamping arrangement when turning radius to meet boiler cladding

Diagram 11.

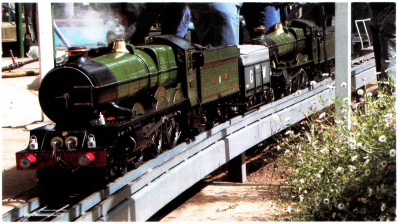


Drawing No. 16 Boiler Fittings — Domes Scale: Full size

Wagga Wagga's 25th Anniversary

by Gerardus Mol

Digital images by David Proctor



Reg Watters' 5" King and Manor are about to depart the steaming bays

This year's Invitation Run, held each first weekend in November, became a special event. It celebrated the 25th year since the formation of the club, 21 years at Willan's Hill and was the 15th Invitation Run.

Over 400 visitors attended the invitation Run from as far away as Queensland, Victoria, South Australia and the ACT to help celebrate the event. Motive power totalled 40 steam and 21 non-steam locos which made for some slow running at times. Friday was a little cool with occasional light showers which did little to dampen the running. Murray Hill turned up early Friday morning to raise steam well before most others arrived to unload their locos and prepare them for the weekend's event.

It was grand to see many old faces and a number of new ones too. Those who had not been to Wagga Wagga for some time really noticed the amount of work put in by the members of the club. The grounds looked a picture whilst there was a marked improvement to the signalling in the tunnel and leading down to Iron Bark Sidings — no more deep gouges in the dirt (even the dirt has gone) on either side of the track for those needing to make that desperate sliding stop!!!

Lloyd Sawyer tries out his rebuilt 72 class and brake van in 7¹/₄"

Murray Hill brings a load of passengers down from the top loop

We were surprised to see three 7¹/₄" gauge 'Black Fives', although only one was the correct colour (green!) (*According to Gerardus !.. Ed.*). Also on 7¹/₄", Bill Henderson had his Schools Class loco whilst George King brought along his *Royal Scot*. On the 5" gauge, Reg Watters ran his Great Western King and Manor locos and accompanying train of carriages — for a while, it seemed we were going to be flooded with English locos!

A good variety of locomotives were present over the weekend; some being new to the track. Newcomer to the hobby, Lloyd Sawyer, had a great time with his recently rebuilt NSWR 72 class diesel loco. He was seen driving well into the night along with other keen drivers.

Although scale rolling stock numbers were down on previous years, there were some very nicely detailed models out on the track at quieter times

Yes, Club Roundup editors do have fun! Gerardus takes the Blowfly for a quiet run and it appears that model engineers are putting a great deal of effort into the fine detail for their models. Alas, those who do must occasionally worry about what is coming up behind then when they are out on the track.

Hugh Whitmore's award winning Black 5 rests at the end of a busy day on the track

Saturday was cool and a little overcast at times but fortunately, the rain stayed away. It seemed as though every one was out on the track having a good time. By early afternoon, it became very busy and it took almost two hours to do three laps of the track. Those who were not running trains, enjoyed themselves watching trains crawl by and having good chin wag, something we all seem to do so well. At 2:30pm, it was the Official Opening of the event and the Mayor of Wagga Wagga officiated (along with the local state MP). Certificates were presented to the four founding members who were present, Ray Catts who started the whole thing, Les and Gay Mouat and Hal Pierce, after which a book on the history of the club was launched, along with a commorative badge. The Mayor was then invited to drive the Official Train around the track under the supervision of Ian Smith — after the official train departed, it was time for the Grand Parade. We were surprised to see Keith Hartley driving a non-steam loco! A2's forever, eh Keith?

Anyone wanting a copy of the book and the badge can send a cheque or money order for $18 to:

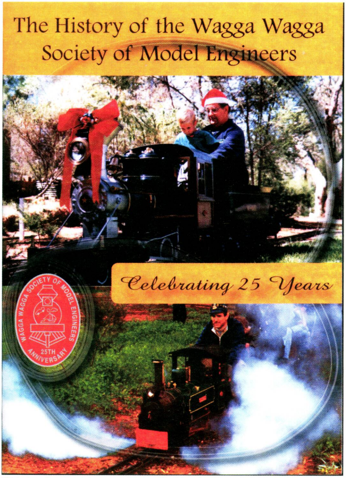
WWSME
PO Box 119
Mt Austin NSW 2650

Just before teatime, most drivers parked their trains to prepare for the BBQ. Only a couple of trains remained running around to take advantage of the quiet time. One driver was seen having his BBQ tea on the cab roof of the loco whilst he was driving around the tracks taking full advantage of the lull in traffic — Meals on Wheels? Soon after, locos once again took to the tracks and steamed into the night — there is always something special about driving a loco at night.

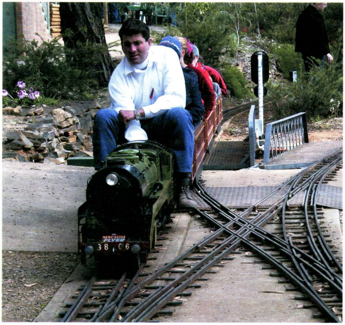
During the evening, there were a number of visitors from the model railway exhibition down the road who had come to see the real trains. It was surprising the number who had never seen such an event before. They seemed to enjoy themselves and were seen trying to get as many rides as possible. Even the short shower did not deter them from their enjoyment.

Sunday turned out to be a great day weather-wise and as it was a public running day many passengers were taken for a ride around the tracks.

The Best New Loco Award went to Hugh Whitmore of Sydney SMEE for his 7$^{1}/_{4}$" gauge LMS 'Black 5' loco, in LMS black livery. The Achievement Award went to Len Whalley for his 5" gauge container train.


The History of the Wagga Wagga Society of Model Engineers
Celebrating 25 Years
WAGGA WAGGA SOCIETY OF MODEL ENGINEERS
25TH ANNIVERSARY

This book was written and compiled by the host club's young treasurer Ben de Gabriel and gives a very detailed history of the WWSME. The commorative badge is featured on the book cover.



Bruce Hagan carefully guides John's 7$^{1}/_{4}$" NSW C38 class loco and coach set through the point work near the steaming bays

A Mini-Router Table for Finishing Clock Wheel Crossings

Philip W Kuchel

Drawings and digital photographs by the author

Introduction

As clockmakers we all know that crossing out and finishing the wheels is probably the most exacting part of making a clock. The aim here is to describe the construction of a device that is centred on a Dremel (or similar) hand-held high-speed drill that can be used to effortlessly cross out the spokes and finish the inner- and hub circumferences of clock wheels.

The intention is that the diagram and the descriptive key that is given below are sufficiently detailed to enable the astute clockmaker and hobbyist to figure out how the device 'works' and should be used.

The diagram was originally drawn to scale with the scale-bar being the 200mm double-headed arrows on the right. To generate a true scale plan from the diagram simply enlarge it in a photocopier, to make the scale-bar 200mm long.

The router table has the end mill projecting up through a hole in the table. Two screws that hold the body of the Dremel drill adjust the extent of projection. The wheel that is to be finished is clamped into position on the movable subsidiary table that has a vertical rod that passes through the drilled centre of the wheel. The guides and two end stops on the main table are adjustable and determine the limits of movement and relative location of the wheel, that is being worked upon at the mill-head. The movement of the wheel relative to the mill-head, within the limits prescribed by the guide and end stops, is under free-hand control.

Items on the router table

Figure 1 shows a schematic representation of the device. The key to the various items on it is as follows:

(**a**): This is the 'table' that supports the Dremel drill assembly. It is a square piece of MDF board that is 10mm thick and 200mm on each side. It has another piece of MDF board (**b**) screwed into its under side, at right angles to the plane of the table (**a**). This additional piece of MDF is the means whereby the whole assembly is held in a bench vice.

(**c**): This is a piece of 10-mm thick Perspex that has a precise straight edge (lower line in the diagram) against which the Perspex rectangular upper or subsidiary-table (h, see below) can slide. The shaped piece of Perspex (**c**) can rotate about the screw **c"** (on the right of **a**) in the plane of **a**. At its left-hand end in mounted a 15mm high brass post (**c'**) through which is screwed an 80mm long screw (5mm diameter) that lies parallel to the main table (**a**). This screw passes through the flat faces of two fingers of a brass assembly that has a knurled nut (**d**) in its centre, running on the screw from **c'**. Thus, turning this nut alters the angle of the arm (**c**) relative to the front and back edges of the table (**a**). The arm

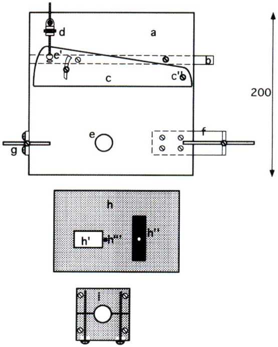


Figure 1 — Schematic top views of the mini-router table, used for finishing the crossing out of clock wheels. The various items on the device are described in the main text.

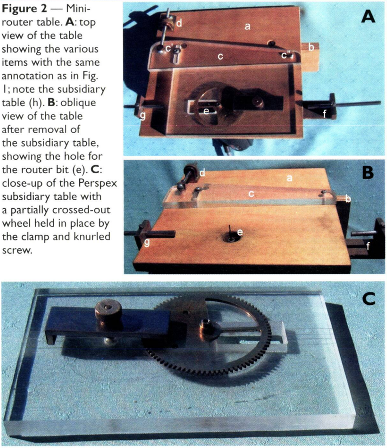


Figure 2 — Mini-router table. **A**: top view of the table showing the various items with the same annotation as in Fig. 1; note the subsidiary table (h). **B**: oblique view of the table after removal of the subsidiary table, showing the hole for the router bit (e). **C**: close-up of the Perspex subsidiary table with a partially crossed-out wheel held in place by the clamp and knurled screw.

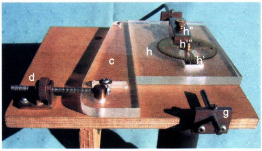


Figure 3 — Oblique view of the top of the mini-router table showing details of the straight-edge (c) and the screw assembly for adjusting the cutting-depth (d).

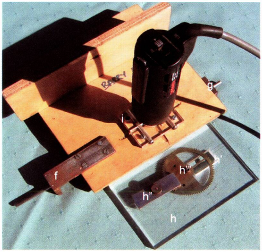


Figure 4 — Underside of the mini-router table showing the assembly for holding the end of the Dremel drill. Other items in the picture are labelled the same as in Fig. 1.

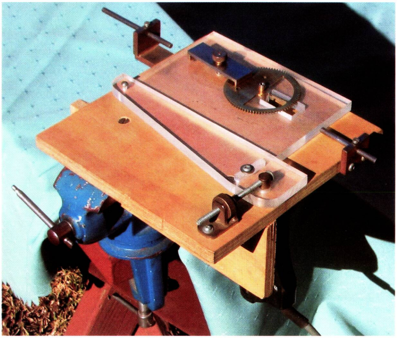


Figure 5 — The mini-router table clamped in a bench vice in a configuration like that used when crossing out wheels.

(**c**) has an arc-shaped slit cut in it, through which passes a wood-working screw that holds the arm (**c**) in close contact with the main table (**a**).

(**e**): This is the hole in the main table (**a**) through which the mini-router bit projects upwards.

(**f**): This is a steel bracket that is held in position by four screws on the under side of the table (**a**). The outer end of the steel bar carries an upward-projecting steel rectangle through which passes a 6-mm rod; the rod lies parallel to the main table (**a**) and lies above it by ~2mm. This rod is held at various positions by a

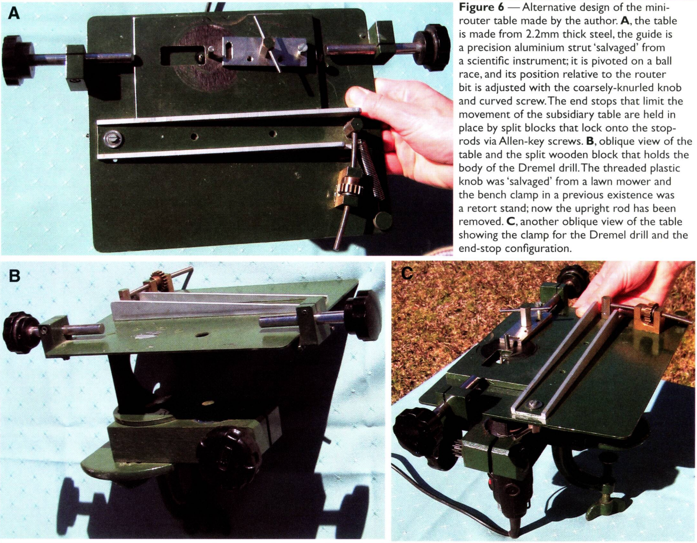


Figure 6 — Alternative design of the mini-router table made by the author. **A**, the table is made from 2.2mm thick steel, the guide is a precision aluminium strut 'salvaged' from a scientific instrument; it is pivoted on a ball race, and its position relative to the router bit is adjusted with the coarsely-knurled knob and curved screw. The end stops that limit the movement of the subsidiary table are held in place by split blocks that lock onto the stop-rods via Allen-key screws. **B**, oblique view of the table and the split wooden block that holds the body of the Dremel drill. The threaded plastic knob was 'salvaged' from a lawn mower and the bench clamp in a previous existence was a retort stand; now the upright rod has been removed. **C**, another oblique view of the table showing the clamp for the Dremel drill and the end-stop configuration.

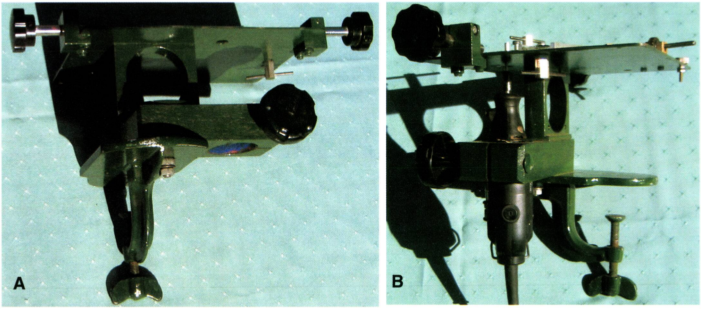


Figure 7 — Underside of the mini-router table shown in Fig. 6. **A**, shows the bench clamp, the Dremel-drill holder, and the spacer (block with a circular hole in it) that separates the Dremel holder from the table and which is bolted to the bench clamp. **B**, a different perspective of the underside of the mini-router table with the Dremel drill in place, in its clamp.

screw through the upper end of the steel rectangle. The 6mm diameter rod serves as a 'stop' to prevent the right-ward travel of the subsidiary table (**h**, see below).

(**g**): This is another steel rectangle, but it is fixed by two screws into the edge of the table (**a**). Through the centre of the rectangle passes a 6-mm diameter rod that serves as 'stop' of the left-ward motion of the subsidiary table (**h**). The rod is held in position by a screw through the top of the steel rectangle, as for **g**.

(**h**): The free-sliding subsidiary table is made of ~4mm thick Perspex. It holds the wheel that is to be 'finished' (crossed out etc): **h'** is a rectangular hole through which the mini-router bit projects vertically. On the immediate right-hand side of the hole, and in a central position, is a vertical 5mm diameter rod (**h'''**) on which the clock wheel can rotate (on its precisely drilled and broached central 5mm hole) while held flat on **h**. A post that is of a smaller diameter (3mm) can be used, and adaptor sleeves can be added to it to accommodate wheels with centre-holes of diameters larger than 3mm. **h"** is a clamp made from a rectangle of mild steel plate with a rectangle that projects down by ~2 mm at one end; this allows firmer clamping of wheels made of brass that are 1-2mm thick. The mild-steel plate has a central hole through which passes a 5mm head-less screw, and the plate is tightened down onto the 'work' by a knurled nut.

(**i**): Device for the attachment of the Dremel drill motor to the under side of the router table. It is: (1) made from ~8mm thick Perspex; (2) a square that is split transversely; (3) held together by two ~5mm diameter screws so it acts as a clamp to hold the head of the Dremel motor; and (4) attached to the under side of the 'table' by the four wood-working screws, as indicated.

Pictures of the real item, as originally made by Barry Lees, are shown in **Figures 2 to 5**. And pictures of a rendition with a steel table, aluminium guide arm, and a body-clamp made from jarrah for the Dremel drill, as made by the author, are shown in **Figures 6 to 7**.

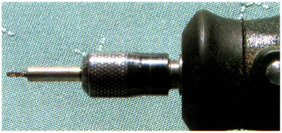


Figure 8 — Dental bit strengthened by a brass-tube collar that is soft soldered in place. The modified bit is mounted in the chuck of the Dremel drill, as shown in Fig. 6.

Conclusions

The tedious part of crossing out is "filing to the line", and this is what the mini-router table does best! If the piercing saw is used to leave say 0.25mm (0.010") then the mini- router table will clean it up beautifully. In other words, it is impossible to use the Dremel mini-router to carry out the full crossing out process from scratch. And, care must be taken to hold the work in the subsidiary table very firmly; the bit can 'grab' if the milled face is moved in the same direction as that of the cutter. For best control over the milling process move the work against the direction of rotation of the cutter at the cutting face.

The surface finish is not suitable for the final product so it needs to be lightly draw-filed and/or scraped and then burnished. This operation takes only a few minutes since the surfaces are already very uniform.

The router bits are available from dental supplies. I obtained mine from Gunz Dental of Rosebery in Sydney (free call 1800 025 300). I use bits that have a cutting head that is 1.3 diameter x 4.4 mm long, mounted on a steel shaft that is 2.33mm in diameter while the whole bit is 44mm long.

These bits are quite fragile as the steel shaft is tapered down from the main its diameter to the cutting head diameter over a distance of only 4.5mm. Hence lateral pressure on the head must be kept to a minimum, other wise the tip will snap off at its junction with the taper.

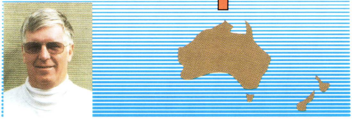
When cutting brass I don't run the Dremel at full speed (~35k rpm) but more like half speed.

Another procedure introduced by Frank Percival is to fit a brass sleave over the end of the shaft of the bit, and then fill this with soft solder (**Figure 8**). This strengthens the tapered section of the bit and greatly reduces the number of fractured bits.

Acknowledgements

The original device was made by Barry Lees and was based on ideas from Graham Sharp and Ken Prentice. Frank Percival came up with the idea of how to protect the milling bits. I thank Phil Coleman and Rex Swensen for encouraging me to extend this description from one that was originally prepared for a meeting of the Sydney Clockmakers Society. All of us are Members of that Society.

Club Roundup



with Gerardus

Adelaide, SA

The intrusion of Government Legislation has proved to be quite traumatic for some members: a culture shock to say the least. The reality is that the expectation of the Society has changed, so now we point the finger at someone to blame. If we want the luxury of the public paying the bills, we have to accept the responsibility to safeguard the health and safety of those who ride our trains and that of our own members, families and friends.

We had our annual visit from the Certifying Engineer to inspect our 'much changed' grounds prior to the upcoming registration. He expressed pleasant surprise at the changes, especially with the fence work. He was able to tick off all the items listed by him on his visit here last year. Seats in the area were duly scrutinised for splinters and roughness; the bridge decking received a good going over as well. Two trains were commandeered for a ride and a full brake test — all was well!

Adelaide Miniature Steam Railway Society Inc.
Location*: 370 Regency Road, Prospect*
Public Running*: 4th Sunday*

Auckland, NZ

This year's main project was a concerted effort to replace the station and we are still in the thick of this. The foundations for the new station have been laid and if all goes to plan, the building itself will be completed within a few weeks. An opening function has been planned for the first weekend in December.

The club has also made steady progress with maintenance projects over the year although several are still in the pipeline. The new electric locomotive is now operational and can be rotated on the duties with the existing club loco.

Auckland Society of Model Engineers
Location*: Petersen Road Reserve, Waipuna Road, Panmure*
Public Running*: Every Sunday*
www.asme.org.nz

Balcatta, WA

The Society's two main objectives for the past three years have been achieved, i.e. public running and the new Clubhouse /Workshop building. These objectives were achieved through the dedication of members, especially the retirees who pitched in and got on with it.

Public running has proved popular with both patrons and members alike, the proof of which is the number of members who sign on each running day. We set a new Public Running Day attendance record this month. We also had 26 members on site, most of whom were present all day. At one time, there were six trains in action: however, there were some casualties. George Palmer's C38 sprang a leak and had to retire. Ron Date's C32 suffered a pipe break on the injector line and had to work on the axle pump only. *Speedy* had steaming problems due to a clinkered grate but the *Blowfly* worked well all day, nicely maintained by Eric Redford.

Stuart Martyn, a prolific model builder, has recently completed his version of a 5" LBSC-designed *Speedy* which successfully underwent steam trials at the Society's track on the last running day.

Northern Districts Model Eng. Society
Location*: Vasto Place, Balcatta*
Public Running*: Last Sunday*
www4.tpg.com.au/users/jimclark

Bankstown, NSW

The AGM held in August resulted in the following members being elected as office bearers: President: Scott Robertson, Vice President: Rodger Critchley, Secretary: George Beavis, Treasurer: Dick Young and Directors: Laurie Collis and Bill Manners.

Note: Our postal address is PO Box 24 North Revesby 2212

General improvement and maintenance of the track is a continuing process and many split and unsatisfactory sleepers have been replaced, and a retaining wall has been built adjacent to viaduct to prevent further erosion of the bank. A deviation of the track alongside the canal has been pegged out and work on the track foundation is to commence in the near future. This deviation will improve track safety. We have suffered further vandal attack and two water taps have been broken off at their base. All passenger cars are being inspected and worn parts will be replaced.

Bankstown Steam Locomotive Soc. Co-op
Location*: Ruse Park, Hoskins Street, Bankstown*
Public Running*: 2nd Saturday*
www.webmaker.com.au/bsls

Blenheim, NZ

The August Section Meeting was an interesting and well attended function. Dave brought the "Black Five" boiler plans along for discussion to see what modifications may be needed to enable them comply with the latest AMBSC regulations. This process was repeated at the September Meeting for *Railmotor* boiler plans. Ken brought along slide bars and connecting rods for his $2^{1}/_{2}$" gauge NZR AB class locomotive. These have since been fitted and the locomotive can be pushed along with one finger.

There are two additional running events coming up soon: 'Christmas in Beaver Town' on the 13th December and 'Heritage Day' on the 18th of January 2004. This is to be an Open Weekend so the track will be operational on the Saturday.

Marlborough Associated Modellers Society Inc
Location*: Brayshaw Park, Blenheim*
Public Running*: 1st Sunday*

Bulla, Vic

It has been decided that the weekend of March 14 will be set aside for our inaugural Birthday Run and Official Opening of the station. The Birthday Run will be open to other clubs and it is anticipated that this will be an annual event.

The up-date on the station area is quite a list! A small team has continued to work on the tiling and painting and erecting of cubicle doors in the toilet block, and this is now in use. A babies changing table will also be provided, which will be a great boon, especially when we have Kindergarten hires. The completion of the ticket box will follow, and then the various fittings in the 'staff' area and canteen. The northern end of the station has been piped for water, so the 5" and $7^{1}/_{4}$" engines can now fill at the station. Piping to the southern end for the smaller gauges is next. The necessary signage for the station area is also being checked and organised.

The bridge is already on site waiting for the foundations — $1^{1}/_{2}$ tonnes of foundation material is being milled ready. As a matter of interest the holes for each of the foundations take up an area four metres cubed, two and a half metres deep!

Council's plan for the Childrens Playground has been agreed and approved, and will be sited right near our entrance. One aspect was originally planned to feature planes, but this has now been altered to a train theme. Hopefully the playground will be operational by the middle of next year.

The superelevation on the worst curves of the track have been restored with ballast, with all the rest soon to follow.

Billy J now has a new compressor, and there is the facility for a 'top up' at the station. Dave is working on a re-railer for the Guard's carriages — these **won't** be suitable for use on loco's.

Several fire extinguishers, first aid kits for the station area, club rooms and portable track, and a fire blanket for the kitchen area have been purchased. None of this stuff comes cheap, with the outlay being over $950.

An item of bad news is that Parks Victoria have re-shaped their grant program. For the next three years or so the emphasis will be on Parks Vic land and in particular bushfire response. We will miss their funding.

A special vote of thanks went to all members attending the last few public run days. Everyone arrived earlier to take advantage of the public arriving early. This was rather embarrassing, as the public decided NOT to arrive early on those particular days!

Tullamarine Live Steam Society
***Location**: 15 Green Street, Bulla*
***Public Running**: 1st & 3rd Sundays*
netconnect.com.au/~tlss

Bunbury, WA

October is our AGM month and the outgoing committee were re-elected unopposed, after a job well done in preparation for the upcoming Convention. Our last run day was a success with six trains running through the day, all running over the new extended track layout. No problems were experienced with the new track including the steep climb up and over the lower track via a new bridge. All trackwork in the park is now dual gauge 5" and $7^1/_4$", with the new extension laid with plastic sleepers. November will be a very busy run day for us so will be a good workout for the new track, but we expect no problems.

All members are working together and looking forward to the Convention at Easter. Some extra trackwork is to be in place behind the workshop area, to be used as storage area/steaming tracks if required but will be $7^1/_4$" gauge only. Some of the smaller engines may like to run on our elevated track of $2^1/_2$, $3^1/_2$ and 5" gauges. We are all looking forward to catching up with new and old friends very soon.

South west Model Engineers Assoc.
***Location**: Forrest Park, Blair St, Bunbury*
***Public Running**: 3rd Sunday*

Burnaby, BC Canada

We are now coming to the end of our running season but the passenger count is still slightly ahead of any previous year, despite this being a shorter 'running year' than most. The dry weather has been horrible for our forest and reservoirs but it's been great for the crowds coming out for the weekends.

The Tuesday crew are up to full strength after the summer break and they will be busy right through the winter. Their work keeping the fleet of riding cars and locos going all season has been the strength of the club. Visitors are impressed with the club's workshop facility and members are welcome to use it to help build their models. After all, that is what the club is all about — maybe we can help one another become more 'constructive'.

British Columbia Society of Model Engineers
***Location**: Rainbow Creek Station, 120 Nth Willingdon Ave, Burnaby, BC*
***Public Running**: Saturday, Sunday & public holidays, Easter to Thanksgiving*

Canberra, ACT

The Canberra club held its annual invitation run to coincide with Floriade as usual. Attendance was down a bit on previous years but those who attended appeared to enjoy themselves. Extensive work has been undertaking on site to improve storage facilities with the purchase of an additional 40 foot container and the erection of a shed which has been in 'kitset' form for several years. All work is being done in such a way as to be easily removed and relocated when the day comes to vacate the Kingston site,

Andrew Mottram from the Netherlands was in town for a few days early in October and joined the 'old farts' group at the track for a day. Andrew was in Australia for a holiday during which he appears to have visited many clubs and railway operations, a well spent 3 weeks.

Canberra was the best represented club at the recent Traction engine rally and club member Jim Mitchell was awarded the AME Trophy for his 3" Burrell Compound.

Canberra Soc of Model & Experimental Engineers
***Location**: Geijera Place, Kingston*
***Public Running**: Last Sunday*
www.canberramodelengineers.com

Casino, NSW

The October Labour Day weekend has passed for another year, and what a fantastic success it all was. The arrival on the Saturday evening of the legendary 3801, accompanied by two 49 class diesels

Andrew Mottram visiting from the Netherlands, drives Ian Smith's Bunyip in Canberra

Neil Matherson (WDLS) brought his latest locomotive to the Canberra Invitation Run amd train with over 100 passengers, was the beginning of a weekend to remember. On the Sunday, 3801, with train was the centre piece at Old Casino Station as it broke the ribbon stretched across the main line, officially opening the centenary of the station and the club's 10th birthday celebrations. While the mini rail ran non-stop trains from North casino to Old Casino Station Museum on Sunday and Monday, 3801 and train ran continuous excursions from Casino to Rappville and Kyogle with barely an empty seat. A Rotary sponsored BBQ was held on Monday night as an official thankyou and farewell where the crew from 3801 were treated to a night run on the little trains, thus ending a fantastic weekend.

Pacific Coast Railway Society Inc.
Location: *Cnr Queensland Road and West St, Casino*
Public Running: *EverySunday*
www.casinominirail.com

Christchurch, NZ

The Society has received all the permits necessary to start building track and ancillary services at Hallswell. So far, the building has been erected with the roof going on in September. The doors are currently being made whilst power and lights are now usable in the building

The traverser tracks are almost finished and we have laid approximately 400 meters of track which has been welded and ballasted. The digger has excavated almost all of the track bed for Stage One and the usual volunteers have shifted some tons of pit run and gravel for the track.

The plan for the pond has been approved by the boating section and presented to council for approval it. The only condition is that the main pond must have sloping sides, although the inner harbour can have straight sides finished in concrete or timber.

A piece of original Canterbury Railways broad gauge (5' 3") double headed (bullhead) rail was acquired by Jock Miller, courtesy of Bill Hopkins. The 70 lbs/yard double headed wrought iron rail was used in the broad gauge Canterbury Railways permanent way between 1863 and 1877, being assembled with cast iron chairs and oak or elm wedges. This was used between Lyttleton and Christchurch and Christchurch to Rangiora. The wrought iron rail was relegated to 3' 6" sidings after 1877. A slice of this rail has been mounted up as the **Canterbury Railways Trophy** for $7^{1}/_{4}$" gauge locomotives and/or rolling stock at future Award nights.

Canterbury Soc of Model & Experimental Engineers
Location: *26 Andrews Cres, Christchurch*
Public Running: *1st & 3rd Sundays_*
www.csmee.org.nz

Club Roundup

Most of the material which appears in *Club Roundup* is gleaned from club newsletters, although an increasing number of clubs are emailing or faxing us a report for this column.

If you don't already send us your club newsletter, how about giving it a go, or email or fax us with your club news. Try to keep it to topics which are interesting to others.

Post to :
PO Box 21, Higgins ACT 2615
Fax to: (61 2) 6254 1641
Email to: editor@ameng.com.au

Eltham, Vic

Tom Thumb will be staying home is some recent good news for Diamond Valley Railway members. Following negotiations the railway has purchased *Tom Thumb* the first of the *Bunyips* off the production line. It has been part of the Diamond Valley scene, under original owner Len Cottrell and recent owner Hugh Caddell, for the past ten years and members are now assured of seeing *Tom Thumb* hauling our trains for many years to come.

The new Diamond Valley 'B' Signal box building is nearing completion with painting now in progress. Plans are well advanced for fitting it out and the associated upgrade of signals and points. The fitout of the Relay Room is now at an advanced stage with cutover being planned for late December/early January. Two new Signal Gantries were erected in October, one adjacent to the East Yard and the other at the up end of Meadmore Station. Work on equipping these has already begun and will further reduce the Signal Train task each running day. Signals are also now permanently fixed via lopsided signal posts at DV 257, DV 271 and MJN 198.

Relaying of the Mainline in new 6kg rail has now moved to the Outer Circle commencing with construction of a new set of points for the bottom of the Triangle. This set and 3 panels around the curve towards the north points will be installed before the heavy Christmas traffic days. With the availability of some better quality used rail from the relaying program several panels of worn and pitted 14lb rail will be replaced over coming months to improve the ride.

Diamond Valley Railway Inc
Location: *Eltham Lower Park, Main Road, Eltham*
Public Running: *Every Sun & public hol.*
www.dvr.com.au

Gosford, NSW

The September running day was a fairly good day crowd-wise with the numbers being constant all day. As well as our own club members locos we had three visiting locos in the form of Dave Kirkland's *Bumble Bee* and *Kimba* as well as a Tram from the SLSLS. Leal Brack was also noted trialing his new loco number 10 which seems to be running better each trip.

On September 9 one of our long standing projects got a fairly good kick along when Allan Fogarty and Ken Howells started forming up for the driveway in preparation for the pouring of the first of many loads of concrete the first of which arrived on September 11 The first pour of 3.6 cubic metres was laid and just when the day was coming to an end and backs were starting to give out our friends from Pioneer Concrete came good with another 1.4 metres at about 3:00pm giving us a total of 5 metres for the day. Arthur Minter and Kelly Maybury have been painting and cleaning the top steaming bay. We have been given some shrubs by Gosford City Council to beautify the grounds and these have been planted by the members of the Thursday Gang. John and Evelyn Crowhurst and Keith Lewis have been working on extending the footpath down to the bottom steaming bay with two retaining walls being constructed to enable the ramp to be back filled between the drain and the $7^{1}/_{4}$" carriage tunnel.

Central Coast Steam Model Co-op Ltd
Location: *Lot 10 Showground Rd, Narara*
Public Running: *1st Saturday*

Harare, Zimbabwe

At recent monthly meetings Cyril Haden presented a most interesting talk on 'The Garratts of the NRZ' and Nigel Launder showed a video of a couple who designed and built a light aircraft which eventually flew round the world non-stop. The March meeting took the form of a lunchtime braai and Duncan Palmer steamed his new engine, *Simplex*, which was a great success.

The 2003 AGM was held in August. As the then Chairman, Nigel Launder, had held office for two years, he was not eligible to stand for re-election to that office but offered to stand as a committee member. Duncan Palmer, the Vice-Chairman, was elected to the Chair, Rodney Potter is Vice-Chairman and Ian Andrews continues as Hon Secretary/Treasurer. Committee members are Cyril Haden, Andre Jacobs and Nigel Launder.

Maintenance work has been carried out over the past months but special mention must be made of Mike Watson's gardener who scraped down the inside of the trolley store, painted it and then levelled the floor and laid down granite chips.

Mashonaland Soc. of Model Engineers
Location: *Rainhill Park, Glenara Avenue North, Highlands, Harare*
Public Running: *3rd Sunday?*

Hastings, Vic

Office bearers for the coming year are President Hans Mathes, Vice Pres. Max Edbrook, Secretary Marg Hayward and Treasurer Bill Dickinson.

The club operates a 5" gauge ground level track (plus an indoor HO/OO layout) in the grounds of BHP.

BHP Western Port Railway Society
Location: *BHP Recreation Centre, Denham Road*
Members Running day: *3rd Sunday*
No public running

Mangere, NZ

Tony Smith recently came across a single ram-style hoist in a motor garage. He advised the club that it was for sale and members decided to acquire it asap and incorporate it into the unloading area at some later stage.

On the Bits and Pieces table at the last meeting, David Watt showed a punch and die set for forming copper rivets for the stays around the firebox on his $7^{1}/_{4}$" gauge NZR Wf locomotive. He also displayed the steam dome, firedoor, latches and hinges, plus a set of special cutters that Dave had manufactured to recondition fuel injectors on full size ship engines. Harold Wilkes displayed a $7^{1}/_{4}$" bogie he had built and also had a Model 7 Eaton hydraulic transmission which is to be installed into a shunting loco he is building. Andrew Gildersleve displayed the finished boiler for his Bagnal. It is a steel shell with a wet cylindrical firebox and is fitted with copper tubes. John Burnett had a swing link-style draw bar system for the headstock for his *Heidi* whilst Terry Armstrong had the brass cab for his $3^{1}/_{2}$" *Conway*. Peter Hudson has been perfecting the steam cutoff valve for an air compressor. Mike Orange produced a 15 inch gauge passenger car bogie that he has been constructing for a new fun park facility being built near the Auckland Airport. The Park is called "Butterfly Creek" and will include a Mini Zoo, Butterfly House and 1km of miniature railway which will include several viaducts and a long tunnel.

Manukau Live Steamers Inc
Location*: Mangere Centre Park, Robertson Road, Mangere*
Public Running*: Every Sunday*
http://manukaulivesteamers.orcon.net.nz

Melbourne, Vic

At our last meeting we had a group of enthusastic hobbyists who are getting together to start up a robot wars challage group here in Australia similar to the overseas television shows. They bought in their machines to demonstrate them in motion and discribe how they where constructed from whatever they could get their hands on.

Models on the table consisted of a minature 13/14 century Trebuchet catapult which the modeler had seen in full size on his trip to England. Also shown on the night was a model of a horizontal planer that the builder hopes to power from a steam engine he had prevoiusly shown, and to finish off the night a proposal for gas burner to run a furnace.

The Committee has had its first meeting to get the ball rolling for this year's model exhibition at Monash University. So put the weekend of the 2 — 3 October 2004 aside and we hope to see you all there.

Melbourne Society of Model & Experimental Engineers
Meetings*: 2nd Friday, 92 Wills St, Glen Iris 8pm*
Public Running*: None*

Millswood, SA

The August running day could best be described as a 'super' day. The queue stretched all the way down the lane and out into Millswood Crescent with no less than ten Birthday parties scattered around the grounds. People streamed into the area carrying chairs, folding tables, eskies, birthday cakes and lots of food. The boat boys sailed their craft much to the enjoyment of the huge crowd.

The steam house has a new toy to play with: two chime steam whistles! They were found buried in the tool cupboard a couple of weeks ago so it was decided to pipe them up and give an occasional demonstration. They had a good note and created quite a bit of interest.

The Wednesday working bee is the day when much of the work is done. The reason for this is that so many people are in retirement. The Wednesday contingent averages between 12 to 20 retirees. All are eager to work; so much so that one has to get in early in order to lay claim to the necessary work tools! The club has had to purchase more shovels, rakes and wheelbarrows to keep everyone happy.

South Australian Soc of Model & Experimental Engineers
Location*: off Millswood Cres, Millswood*
Public Running*: 1st Sun. & 3rd Saturday*

Moorabbin, Vic

In August, we were approached by Herless Machinery (part of the Hare & Forbes group) who asked if we would support their First Birthday Sale by displaying some of our models. Assisted by Harold Bone, we were able to set up a good display of our steam, electric, IC and air-powered models. Railway items were G1, $3^{1}/_{2}$", 5" and even $7^{1}/_{2}$" (Mark Watkin's Trevithick "Pen-Y-Daryn" loco). The air-powered model was a miniature horizontal mill engine connected to a bicycle pump. Examples of home made tooling included a Quorn tool and cutter grinder. Nineteen members either provided items for display or manned the stand for varying periods over the three days or both. The Herless people were most appreciative and will be donating a bandsaw to the club workshop in recognition of our efforts.

The 'Silvertops' really enjoy themselves at their weekly Thursday get-togethers: usually around 26 or so members turn up to work, play and socialise the time away. Some of the models on the display tables during the Friday night gatherings include Peter Gray's wooden oscillating engine which runs on a good puff of breath. Keith Hartley's 'PERM' continues to improve; the latest additions being 14 torpedo vents, headlight, radiator and wiring ducts. Dave Smith displayed his partly built cattle van and the wheels for Stephan Gaal's traction engine.

Steam Locomotive Society of Victoria
Location*: 128 Rowans Road, Moorabbin*
Public Running*: 1st Sunday*
www.slsv.com.au

Perth, WA

The big news at Castledare has been the 40th Anniversary celebrations, held over the 11th and 12th of October (*full article in next issue*). The event was a huge success and all are to be congratulated.

A week earlier, the October Run Day was a big success. Fine weather brought out record crowds, and most importantly there was a great turn out of members to look after them. The numbers were boosted both by new faces, and by long standing members returning to the fold. We had plenty of trains in service all day, and our members working all out to keep them running. It was an exhausting but very satisfying day.

Fitting out of the new 5-inch shed has been another big effort. Large amounts of equipment were shifted from the old workshop, which has now been demolished. The opportunity was taken to perform a general site clean-up, and the visual appearance of the site is greatly improved. A steady re-painting effort has also boosted the club's appearance.

Castledare Miniature Railways of WA Inc
Location*: Castledare Place, Wilson*
Public Running*: 1st Sunday*
http://d1565.tripod.com/cmr/

Petone, NZ

Harold Sinclair was voted a Life Member for his long-term involvement with the club and the service he has rendered as secretary in addition to all the practical work he has contributed towards various club projects. Harold has always supported the track operations with whichever has been his current loco at the time. The model engineering movement in New Zealand has been affected by Harold's construction of large scale steam locomotives for ground level tracks.

Work at the track is progressing well with a delivery of timber for the retaining wall. The work party has been busy installing posts as the contractor drilled the holes. Four new points have been assembled and are away being galvanised.

On our September running day, it rained most of the morning but as it was the start of the school holidays, quite a few families were about and we gave 56 rides for the day.

Hutt Valley Model Engineering Soc. Inc
Location*: 6 Marine Parade, Petone*
Public Running*: Every fine Sunday*
www.steammachine.com/hvmes

Salisbury, SA

Our long-awaited forty foot container arrived in September: it will become the loco storage shed for members who do not want to transport their locos to and from the club on their trailers. Storage lines have been laid inside the container and an emergency escape door fitted. The exterior has been cleaned ready for painting.

October saw the introduction of Twilight Runs at the Club. An unprecedented response saw a very large crowd attend the evening event. As it was pre-daylight saving, darkness set in shortly after 6:30 pm so every one had their headlights blazing away and tail-lights flashing for most of the evening run. The canteen did a roaring trade, selling out of most hot food long before the evening was over. Even though it was a cool 11° during the evening, many stayed until after 9:30pm with the last train running until 10:45 pm. Visitors from other AALS-affiliated clubs are welcome to attend these evenings and enjoy the unique experience of running during twilight hours. Our 'Twilight Run' will be held on the second Saturday of January, February and March. Come along and enjoy a snag on a piece of bread with our members before the run.

The last Saturday in August saw a good attendance at the clubhouse for the second Training Session. These sessions will be held on a regular basis to train new members and update the qualifications of existing members who in any way take part with train operations on Open Days.

In the boat section, a certain member was asked to wade into the boat pond with his model tugboat and then kneel down so as to have a photo taken. It was then discovered that the waders he was wearing had a number of holes below the water line, into which the pond commenced to flow. He had to return the water to the boat pond after he returned to shore.

Penfield Model Engineers Society Inc
Location*: Penfield Ave, Salisbury*
Public Running*: Last Sunday*
www.picknowl.com.au/homepages/joanlynn/pmesone.htm

Upper Hutt, NZ

Working bees have been somewhat restricted by poor weather in September, so not much has been accomplished. One Saturday morning, Leigh Penman was able to bring us up to date with work he has been doing on his pet project: the generation of steam utilising solar energy. He has built a ten feet diameter reflector which focuses the energy collected onto a small steel boiler and is able to quickly raise steam and easily maintain pressure. Currently, he has a whistle and does a great job converting solar energy into enjoyable acoustic energy, aka noise. He is looking to develop the project further and perhaps add a small steam engine to make use of the steam generating capacity.

Peter Carr has made great progress with the small steam crane he is building as a project for entry to the Club's competition at the Steam and Steel Expo in Hamilton (January 2004).

The club is having an open weekend on Wellington Anniversary Weekend, on the 17th - 19th January 2004 and we invite members from neighbouring clubs to share the weekend with us.

Maidstone Model Engineering Soc. Inc
Location*: Maidstone Park, Upper Hutt*
Public Running*: Every Sunday afternoon October-April*

Vancouver Island, BC, Canada

A meeting of those interested in the extension to the V&S Railway was held on October 23 with about 25 people or so present. A wide ranging discussion was held about a number of aspects of the project and it was generally agreed that a committee be formed to meet regularly to formulate specific plans and to undertake engineering and general supervision of the work. Mark Obersteller is President for the coming year and Dennis Dalla-Vicenza is Secretary

Vancouver Island Model Engineers
Location*: 7321 Lochside Drive, Saanichton, BC*
Club Run*: 2nd Sunday*
www.pacificcoast.net/~trainman

Whangarei, NZ

Progress is well under way revamping the applications for the clubhouse prior to going back to the people who have indicated that they are willing to help with funding. The members have agreed, to do most of the construction work ourselves, where possible, only using the trades where we don't have the skills within the club. Last running day was overcast and rainy: we did the running between the showers and managed to make $95. This indicates to us that when we get the clubroom with a covered public area, we will hopefully get even more passengers.

The engine storage shed project is now complete: the rebuilding of this shed has gone well with the work being done by keen members during the week.

Whangarei Model Engineering Club
Location*: Heritage Park, Maunu*
Public Running*: 3rd Sunday & every live museum day*

Farewell to our friends

We were sorry to learn of the deaths of these model engineers:

John Beckett (Woodvale, Vic)
Lloyd Grono (Sydney SMEE)
Alice Hudson (Mashonaland SME)
Ben Lyon (Whangarei MEC)

We share the sadness felt by his family and friends, and offer our sincere sympathies. We also remember the many great times we've enjoyed together in our wonderful hobby.

Coming Events

8 to 12 January
Steam & Steel 2004 — Hamilton NZ

The Hamilton Model Engineers are hosting the next New Zealand Convention. Full details appeared on page 57 in issue 110. For more information about this great event contact Valerie Clarke at 51 Alderson Road, Hamilton New Zealand. Ph. 64 7 8551 927, Fax 64 7 8551 307 or email: bandv.clark@xtra.co.nz

17 to 18 January
Two day event — Blenheim NZ

All kindred societies and members invited to join the Marlborough Associated Modelers for a great weekend. Elevated and ground level tracks cater for all gauges $2^1/_2$" to $7^1/_4$", boat pond with harbour, pylon racing cars, r/c aircraft (display). Sunday will be Heritage Day at Brayshaw park, giving you the opportunity to see the others societies and their operations. Win (03) 578 4749 or email: winlyn@value.net.nz

27 to 29 February
51st Birthday — Edgeworth NSW

The Members of Lake Macquarie Live Steam Locomotive Society invite you to help celebrate our 51st Birthday. Club grounds open Friday through to Sunday with Sunday afternoon being our normal public running. Visitors are not obliged to haul passengers. We have $3^1/_2$" and 5" elevated, 5" and $7^1/_4$" ground level tracks. Camping facilities and refreshments available. All are welcome with or without models.

13 to 14 March
Anniversary Run — Bulla, Vic

Tullamarine Live Steam Society will be hosting an inter club run to celebrate the anniversary of our official opening, the opening of our new Station, our new $3^1/_2$" & 5" ground track and our magnificent bridge connecting to our BBQ area. Being the second weekend of the month it is not one of our public run days so all members and guests will have everything to themselves.

9 to 12 April
48th AALS Convention — Bunbury, WA

See below

15 to 16 May
Roadsteam, Stationary Engine and Model Steamboat Run

At Inverell Pioneer Village. The village has an excellent pond for model boat enthusiasts. Camping available on the grounds. This is a BYO event. We look forward to seeing you there. For details ph. Gordon (02) 6722 4272 Peter (02) 4951 2369

AALS 48th Annual Convention

Forrest Park, Blair St, Bunbury, Western Australia

9 — 12 April 2004

• Track is 1.2k dual gauge $7^1/_4$" and 5" ground level plus 100m elevated $3^1/_2$" and 5" to AALS Standard • coal, char and oil provided (supply own petrol) • steaming bays 240 volt, air, unloading ramp, workshop facilities • Night running • Road vehicles • boiler certs a must • max speed 8kph and 20m between trains at this speed.

Registration forms will be mailed to all clubs shortly

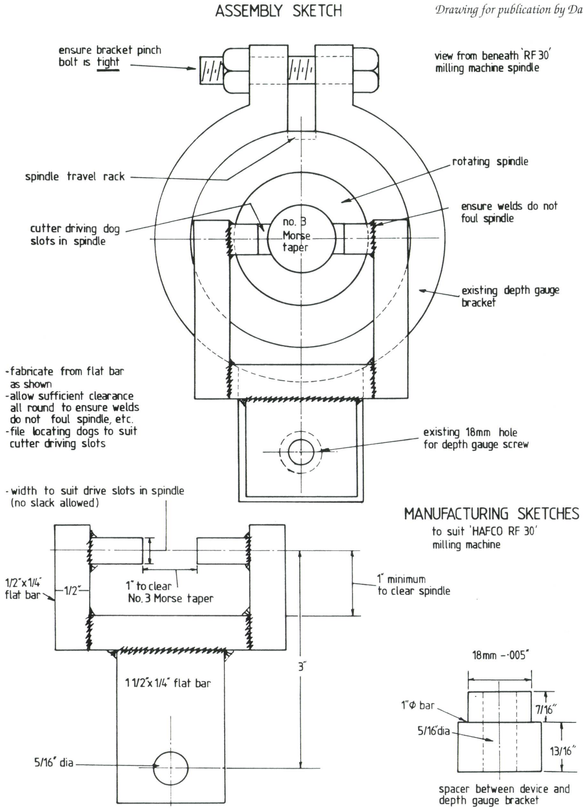
Convention secretary — Ian Morrison, 10 Clifton St, Bunbury WA 6230
Phone (08) 9721 2034 for further details

Spindle Locking Device

to suit HAFCO RF-30 milling machine

by Bob Ellis

Drawing for publication by Dave Adams


ASSEMBLY SKETCH
ensure bracket pinch bolt is tight
view from beneath 'RF 30' milling machine spindle
spindle travel rack
rotating spindle
cutter driving dog slots in spindle
no. 3 Morse taper
ensure welds do not foul spindle
existing depth gauge bracket
-fabricate from flat bar as shown
-allow sufficient clearance all round to ensure welds do not foul spindle, etc.
-file locating dogs to suit cutter driving slots
existing 18mm hole for depth gauge screw
-width to suit drive slots in spindle (no slack allowed)
MANUFACTURING SKETCHES
to suit 'HAFCO RF 30' milling machine
1/2"x1/4" flat bar
1/2"
1" to clear No. 3 Morse taper
1" minimum to clear spindle
3"
1 1/2"x 1/4" flat bar
5/16" dia
18mm –·005"
1"Φ bar
5/16"dia
7/16"
13/16"
spacer between device and depth gauge bracket

This device was made up in order to allow the mill to be used as a hand operated slotting machine without the usual spindle rotation problems. It could probably be modified to suit other types of mill.

A 2" long x 5/16" W bolt, nut and washer secures the device to the existing depth gauge bracket, the depth gauge screw having been removed. When in place, the device is not particularly obvious, and the machine would not be happy if that 'green button' were pressed!

Metrology

The Physics of Measurement — part 3

by Dennis Collings

Large Toolmakers Microscope (Carl Zeiss Jena Germany) (**figure 20**) — Goniometer Ocular, Dial Template Oculars, Optical Scale Horizontal Measuring Machine.(Societe Genovoise Switzerland.) Used to measure diameters of plug gauges, thread gauges on outside diameter, and over wires for the pitch diameter. Also for measuring the larger D.P gears over wires.

Bench Micrometer (**figure 21**) — The micrometer has higher magnification due to the large thimble associated with an indicating anvil which eliminates errors of measuring pressure. Thimble will read to .0001"

For taking the same measurements has above. The machine is portable so can be taken to the machines manufacturing the components by cylindrical grinder, thread grinder, or gear cutter. This allows a quicker time over inspection of the component, to return the component to the machine for adjustment before the machines change temperature, or grinding wheels going out of balance due to coolant collecting at bottom of grinding wheel if stopped.

Shadow Contour Projector (**figure 22**) The projector is very handy to check shapes which are not on standard templates, like special lathe, or fly cutters for use on a milling machine to make those odd replacement gears. The templates are drawn or generated on an engineering drawing board to the magnification you are going to set on the projector. The shadow of the component is then compared to the drawing, larger dimensions by rule smaller dimensions by a special weighted micrometer 0-1" with a flat blade to pick up drawing lines. Subtracting the magnification used from your figures. We used this projector to check the thread forms on parts, and gas bottles that crashed into West Australia from the first American space station.

AngleDekker Autocollimator Figures 23-24) — The Autocollimator is the ideal optical tool for solving many metrology problems in the laboratory, standards room, inspection department, and the toolroom. providing the must accurate and easiest means of carrying out measuring operations such as calibrating large surface plates, the straightness of table movements, the testing of dividing equipment by using a precision polygon.

The Autocollimator consists of a telescope with the means of illuminating a graticule placed in the focal plane of the objective. Parallel or collimated light emerges from the objective lens and is directed at a plane reflective surface. Set at right angles to the optical axis of the telescope. The rays from the illuminated graticule are reflected back through the objective and form an image. The displacement of this reflected image from the graticule is measured by a micrometer eyepiece reading direct to o.1 of a second over a range of 10 minutes of arc. The field of view of the instrument and method of reading see figures 23-24.

Optical Flats (**figure 25**) — Functions of an optical flat is that it be capable of producing the optical phenomenon of interference when properly related

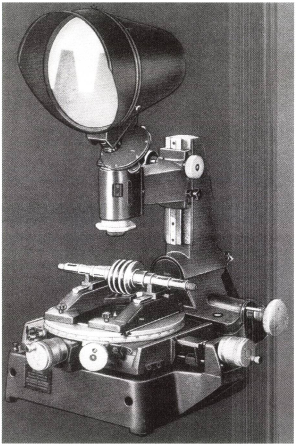


Figure 20

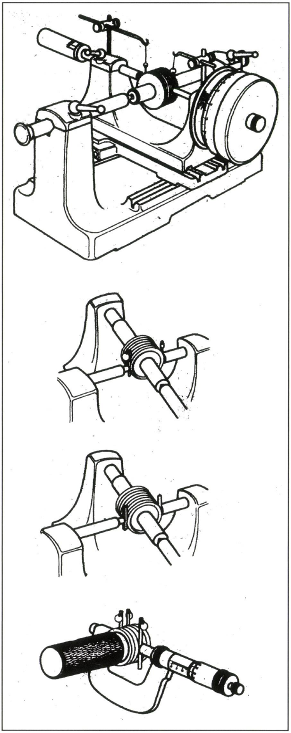


Figure 21

to a second reflecting surface in a suitable light, such as amonochromatic light source, thereby producing the interference fringes, or bands.
A standard optical flat shall satisfy the following requirements, manufactured from only clear fused quartz, or pryrex glass.

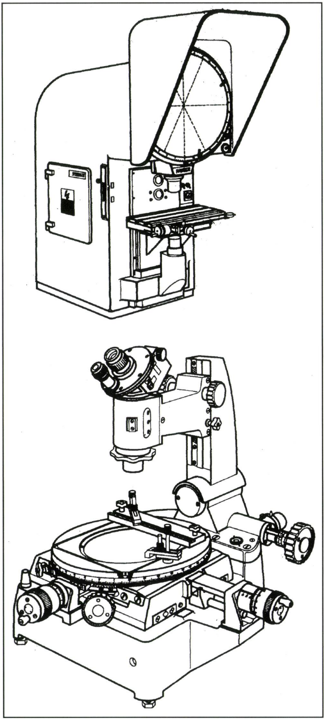


Figure 22

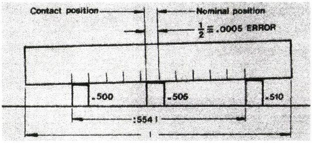


Figure 23

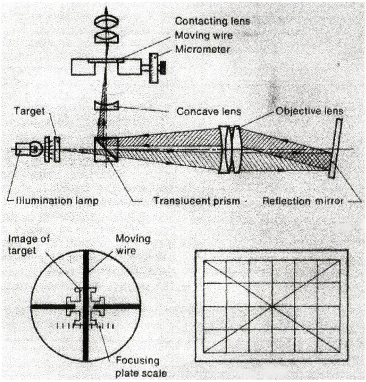


Figure 24

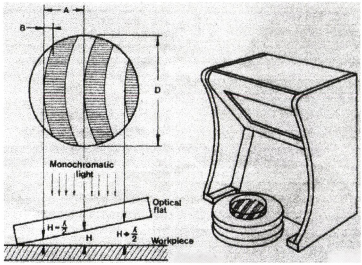


Figure 25

Two to three inches in diameter by $^1/_2$ inch thick (for checking slips). Transparency, reflectivity, low thermal expansion, and rigidity. Method of use, when a flat surface is viewed under the monochromatic light through a optical flat resting on a master slip inclind at a very small angle to the worn slip under test (both are normally the same height), coloured bands (yellow and black) are visible. Each band indicates a difference in height of the master slip above the slip under test (each line equals .000004" so if you have ten lines the slip is .00004 under size).

Any curvature of these bands indicates that the surface is slightly concave or convex.

Dial and test Indicators (figure 26) — The dial gauge and test indicator are tools which find many applications both on machining, and grinding, also in the inspection room. Many different types are available ranging from 0.001" to 0.00005.

Electronic Comparators (figure 27)

T62- 4 micro-inches. See top sketch lay designation the only one we used were the perpendicular to edge. Used when examining inner surfaces of radar wave guides. Any scratches or marks across the surface would interfere with the wave length of the signal. (surface finish 16 and dimension tolerance +/- 0.001)

Centre sketch standard drawing practice, bottom sketch the equipment

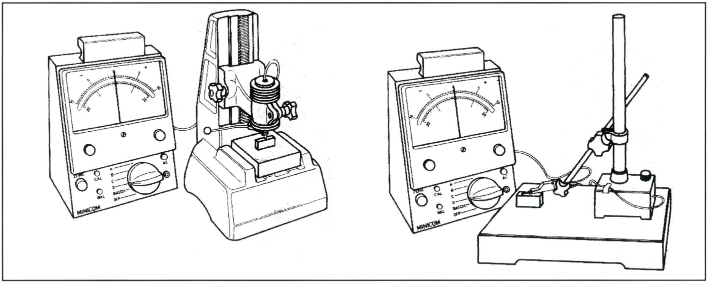


Figure 26

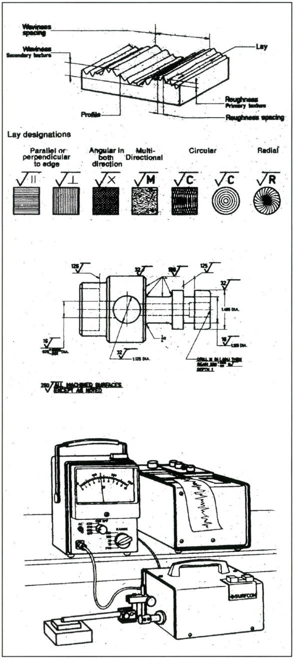


Figure 27

used.

Three Co-ordinate Measuring Machine X-Y-Z (**figure 28**) — The one we had was located in the main machine shop inspection, and used mainly to check hole positions in large numbers of components.

The top sketch shows the read out cabinet and controls which allow you three tolerances to read to +/-0.001 +/- 0.005 +/- 0.010 of an inch. Top read out is "Z" for depth dimensions, middle readings "Y" length dimensions, and "X" are width dimensions. Bottom sketch shows the main machine showing moveable arm, and probe holder. The concertina coverings are to protect bars with fine copper wire windings, with wipers on the read outs. The machine is supplied with a number of tapered probes to cover hole diameters from $^{1}/_{16}$ to 6 inches, sharp point, 0.5" diameter mandrel for measuring larger bores or straight edges, and one edge finder.

I hope the readers of this article have found interest and knowledge of the equipment and working of a small metrology laboratory between 1956-1980.

It was twenty four years of interesting work, with many insights into other scientific endeavours in their early days.

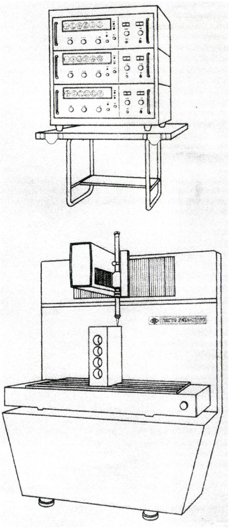


Figure 28

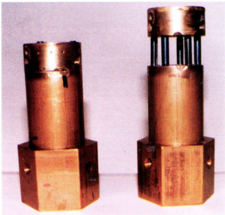
Sources

Metrological Instruments Carl Zeiss Jena, 1962
Metrology Handbook McPherson's Ltd.,1970
Van Keuren Measuring Tools No 36/2, 1961 Van Keuren Co Water Town 72 Massachusetts U.S.A
Engineering Measurement School of Mechanical Engineering, Adelaide.1972
Machinery's Handbook 15 Edition The Industrial Press, New York 1956
Angle Dekker Autocollimator Hand Book 1960

Sparks 'n' Arcs

Adapting an electric wheelchair drive to your 5" gauge model

by Malcolm Le Bas



Flexible coupling assembly. Motor output 3/4" shaft to 8mm right angle drive (DZ11) input — 3 drive pins in each direction

I have been eyeing so many of these electric scooters ferrying fellow geriatrics around the shopping centers, thinking that they must be the best solution to drive a 5 inch gauge rail model — smooth, powerful, has to be efficient and are available. So, after a couple of elucidating discussions with the local scooter shop expert and direction from Don Payne, I obtained a second hand Damaco D88VS portable power system for a small donation (it only had one small fault, namely a stuck brush in one of the motor commutators).

It consists five main components:

1. Two 24 volt permag motors, capable of developing well over ¼ horsepower (190 watts) each, integral with 4:1 ratio gearbox, efficient helical gears and ball bearings throughout.
2. Battery charger electronic control, 2.5 amps limit.
3. Electronic control unit.
4. Manual control box, joystick direction and speed, low and high speed switch, low speed adjustment knob and power switch.

This makes the unit ideal for adaptation to our needs.

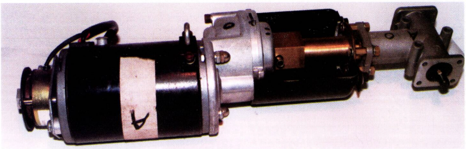
Alterations (in sequence)

Motors:— Remove both rubber friction drive wheels from output shafts (they conveniently happen to be 4" in diameter)

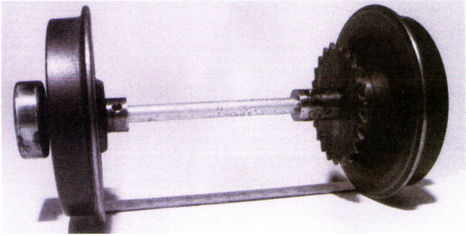
Note: I used two DZ11 1/1 gearboxes (right-angle drive) from OEM Dynamics in Ballina, although rated at ¼ HP, input and output shafts are only 5/16" diameter, giving me much trouble with bending internally. The gearbox also had to fit between wheels and allow for chain sprocket to provide traction to all wheels.

The DZ11 is then mounted on the end of the friction wheel housing in alignment with the ¾" motor gearbox output shaft, a flexible coupling is then devised and fitted between it and the 5/16" right-angle drive input shaft.

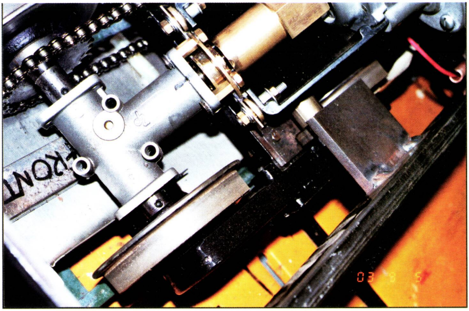
In my case the units are fitted to existing Sandberg bogies (for a model 70 class diesel). All four axles were cut and bored appropriately to accommodate the drive and chain sprocket and intervening idler sprocket for correct tension. As the motor units are mounted on the axles a

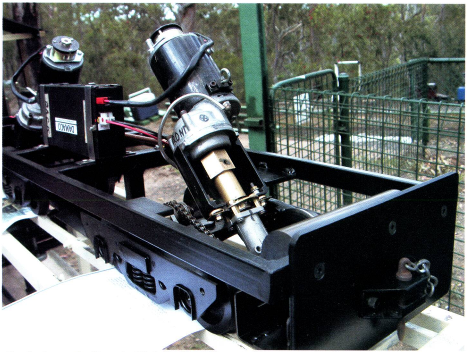


Early construction assembly



DZ11 fits between axle stubs (5/8"Ø)





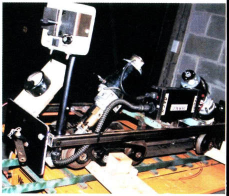
On display at the Hornsby Birthday Run. Note modifications to bogies. Digital image: David Proctor

springy limiter was formed from $^3/_{16}$" s/s rod to stop the motors from flipping over under heavy load. The motors and control unit are designed left and right handed so for only forward and reverse running, must be mounted back to back (they rotate in opposite directions).

Battery charger:— needs no alteration

Electronic control unit: — Try to avoid even taking the cover off! Just mount it on your model between the two motors and connect the appropriate wires and plugs carefully. It provides smooth pulsed DC power to both motors.

Manual control box:— The only alteration needed to this unit is to make a slotted sheet metal panel fitted over the joystick to prevent any left and right movement leaving only forward and reverse. All the other controls are utilized.



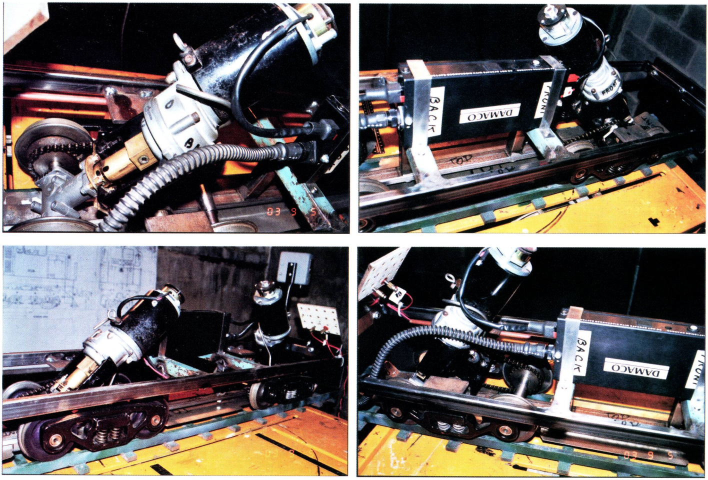
The completed engine chassis and power unit being test run on the author's bench.

The model had its first run at Galston in a raw and undressed state on 20 August 2003. It performed beautifully, drawing most of the time less than 1 Amp and on the long hill at top speed 18 Amps. Running speed is a little over 8 km, low speed control can only be described as perfect.

***Sparks 'n' Arcs* is the column for all modellers of electrically powered equipment. If you have a project on the go, why not share it!**

All photos by the author unless otherwise stated.

Previous page and this page — assorted construction views



Tracks ' n' Trees

Battery-powered Gauge O and I in your garden

by David "Doc" Wescombe-Down

As an alternative primary power source to steam, or as a happy bed-fellow to it, battery-powered garden railway locomotives are an excellent option to have on hand. They are self-contained, require little maintenance, are available for *instant* use (provided you keep a spare set of batteries fully charged!) and the batteries for them are readily available just about everywhere.

Don't let the electronics fool you — all you will require in the way of tools, are a small 30 watt soldering iron, resin-cored solder, a pair of small side-cutting pliers, your friendly Stanley™ knife and some electricians' tape or heatshrink tubing to cover joins after soldering. Battery holders for AAA, AA and C-type batteries are readily available from Dick Smiths, Tandys and the like, and even the larger, rectangular "gel cell" batteries are not hard to come by. The latter are used extensively for stationary alarm systems and, whilst adding useful mass to the larger Gauge 1 locomotives, can also be trailed in tenders or wagons to suit your requirements.

There are a number of suitable small motor and gear sets on the market if you are looking to dabble in conversions, and their battery needs range from 1.5 to 12 volts, whilst providing low, medium and high torque depending upon your needs. Solar module motors are cheap to buy, and you may decide to look at a solar-powered garden railway.

Dick Smith's catalogue, for example, lists motors, gearbox sets, nylon gears, worm gears, pulleys and drive belts in addition to servo motors, should you want to engage radio control as well. Most major centres will have a source of small sprockets and chains for the heavier duty chain drives which suit the Shay and Climax models particularly well.

These days, both spring (clockwork) and battery power sources for the smaller O and 1 gauges in model engineering, can easily be overlooked, and left to the relatively few classic train collectors who have a real appreciation for them, but battery technology has advanced enormously in the past 10 years, and that is why battery-power is a real option for us today.

We run a few of the Triang "Big Big Train" battery-powered toy trains, some standard and some much-modified, and they are really handy if a steamer develops a hernia down the back of the outdoor layout — we send out a battery-powered work train to collect both the steamer and its consist, and return them to the engine bay. Isn't that how it's supposed to be done? (Make sure the steamer comes back on a "meltproof" item!!)

We find them very handy for doing the initial checks on track extensions and colleagues' new installations, clearance and appearance checks following portal and tunnel construction, and also for instantaneous "doubling up" of locomotives. These locomotives, a Deltic, Ruston diesel and *Sammy the Shunter* steam outline, all run on C or AA batteries, as do a couple of Lima and Atlas shunters as well, and we have a preference for the newer Nickel Metal Hydride rechargeable cells for our operation.

Most small battery-powered locomotives operate from two or four AA batteries, but the heavier Atlas and homebrew items have 12 AA cells in rechargeable packs. The 3 and 6 volt motors available are designed for low battery consumption and long life, but they will absorb higher voltages, provided you do not "push the envelope" too far. Some of the associated decision-making depends on the maximum speed you wish to obtain from the locomotive in question – we run ours at a scale speed of about 25 miles per hour, so speed is not an issue for us. To get more speed from your locomotive, you need to increase the battery voltage and this is done by adding additional batteries in series, but you might first check the amount of room available in your locomotive body to house any planned increases (see **figure 1**).

If your locomotive is short of room in the cab, perhaps you can fit some batteries behind the buffer beams, allowing for a reduction in length of the buffer beam fixing screws/bolts.

The Nickel Metal Hydride batteries are rated at 1.2 volts each, so four of them in a plastic holder will provide 4.8 volts, which the 3 volt motors will tolerate, but it might be pushing things to use four of the regular 1.5 volt AA batteries and hit the motor with 6 volts — twice the intended quantum.

If longer runs are your preference over speed increase, there are a couple of choices: move up to C cell batteries, or use additional AA batteries wired in parallel. The Triang locomotives, as mentioned, will easily take C cells, but the Atlas and Lima shunters don't have enough room. They could, however, be housed in a tender or wagon immediately behind the locomotive, with the connecting wires arranged to represent air hoses.

Figure 2 shows AA batteries wired in parallel to give greater capacity at the same initial 3 volts.

Should you decide to run a stable of battery-powered locomotives, investment in rechargeable cells and a suitable battery charger would be a consideration to make. They will make your operation much cheaper in the long term.

The more usual types of rechargeable batteries available are Nickel Metal Hydride (NiMH) and Nickel Cadmium (NiCad) — the latter have been around for quite a few years, but are destined to disappear from the market in a few short years due to their environmental "unfriendliness". However, if you have them, use them by all means. The typical life of a NiCad battery is between 500 and 1000 discharge/charge cycles — this is dependent upon allowing them to discharge completely before recharging. NiMH batteries currently cost about twice as much as equivalent NiCads, but have a number of significant benefits. They are free from hazardous elements (such as "heavy metals") which makes their disposal more environmentally acceptable; they can be recharged at any time without waiting until they are run down to minimum capacity; and capacity-related performance is typically 30 to 50% better than equivalency in NiCads. In other words, longer running times are available for us!

You can use a simple battery charger, set for 3, 6 or 12 volts as your arrangement needs, or you can obtain a purpose-built charger to do the job.

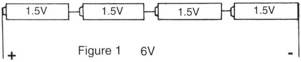


Figure 1 6V

Important — use only fresh batteries of the same vintage. Your battery "bank" will only be as effective (under load) as the weakest cell in it!

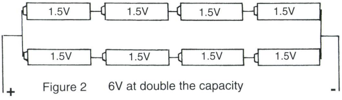


Figure 2 6V at double the capacity

To control all this new-found power source, you will need small toggle switches (for on/off function and forward/reverse) and you may want to have an onboard speed controller. The miniature toggle switches readily available in electronic hobby stores will do for the first two functions, and small wire-wound potentiometers ('pots') from the same source will attend to the latter. Some speed controllers are a discrete electronic unit using advance microprocessor control, and others include the radio- controlled throttle units, such as supplied by RCS in Bayswater, Victoria. Check with your component supplier as to the wattage/resistance rating potentiometer your locomotive will require – it will be dependent upon the voltage and current drain it employs.

Battery power also allows for the versatility of adding light emitting diodes (LEDs) and head/tail lamps to the locomotives and **Figure 3** has some data for assisting you with the choice of a "dropping resistor" necessary for LED use. Flashing LEDs can be used for warning beacons, such as on modern Maintenance of Way vehicles, but make sure you connect them the *right way round* – the long lead must go to the **positive** terminal, or the LED will "blow"! Make sure all of your electrical connections are well-soldered and securely covered with insulation tape to prevent nasty short circuits.

Ensure no fine wires hang loose to touch on metal surfaces, for the same reason. Heatshrink tubing is another way to secure bare wires and connections.

In conclusion, there is a great deal of satisfaction to be had from doing anything yourself, so taking a simple and basic locomotive and individualising it through installing, or converting to, battery power, fits into that category.

You won't have to focus so much on outdoor rail cleanliness; your operations will be instantaneous, and the limitations of such conversions are rather extensive — how good is **your** imagination?

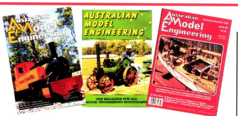
Voltage	Resistor (ohms)	Power source
2.4	none	2 x Nicad or NiMH AA cells
3	56	2 x AA dry cells
4.4	150	3 x AA dry cells
4.8	150	4 X Nicad or NiMH AA cells
6	220	4 x dry cells or 5 x NiMH
7.2	270	Rechargable car/buggy battery pack.
9	330	PP3 (9V) battery
12	560	Track voltage or battery equivalent

Figure 3

EDWIN Builders!

It has just come to our attention that supplies of the 1$^3/_4$" copper tube for *EDWIN's* boiler could be diminishing as this size tube is apparently no longer produced in Australia. Should you have problems getting it Brian Wilson has managed to procure about 6 metres which will make around 30 boilers. You can get it from Brian for $25.00 per boiler length (including postage) by contacting him at :

PO Box 525, Toowoomba Qld 4350



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Trevithick's *Penydaren* Locomotive

By Dave Harper

Photos by John Carnsew

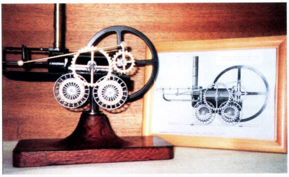
Back in mid 2002 I was pleased to receive a visit by John Carnsew at the Boiler House. John was visiting from his home near Cairns, in far north Queensland, and had called by with a question for me: he wanted to know what kind of valve gear was used on Trevithick's 1804 Penydaren loco!

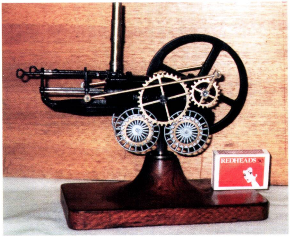
My first reaction was — who knows? In fact, that turned out to be pretty right as there is no detailed documentation or drawings from that long ago! The only drawing is one that is held by the Science Museum in London, and this is simply a front and side elevation. **See figure 1**.

The model *Penydaren* loco

John's reason for asking was that he was planning to build a model of the loco and wanted it to be as authentic as possible. In a later letter John told me he'd found out the loco had a 'Matthew Murray shortened slide valve'. However, on the small scale that he was building, it would have been difficult if not impossible to fit one of those, even if he knew what it was! As the cylinder and valve are encased within the boiler, nobody can see it, and certainly the piston valve he settled on works.

As can be seen in the photos John's model is pretty small, but nevertheless it works well on 3PSI air, and the flywheel is $3\frac{3}{4}$" dia. I quote from his letter that accompanied the photos:





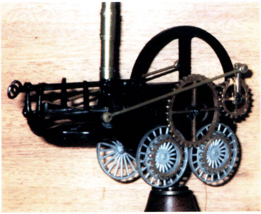
"I have settled for a piston valve over a double acting engine, using the stroke and bore scaled to the original (*$4\frac{1}{2}$ ft x $8\frac{1}{2}$" ... dh*). It appears that little is known about this sort of detail, or so it seems from my research, mainly on the internet. So a print from what appears to be the patent office, and is very short on detail, is all I had to go on.

With great enthusiasm I head to the shed to create this weird device as closely as possible. But what are these small handles out the front, or is that back? Initially I assumed that they operated fore and aft to in some way reverse the direction, but it became apparent that they rotated sideways to stop or start by missing or hitting the valve rods. I have incorporated this rotation in the model, and it seems to prove the assumption. The rest is very much self explanatory, and made by fabricating from anything I could find around the place. The gears were fly-cut in my HQ500 mill lathe, the weird wheels were a bit of a fiddle, but it was important to get them right. I was an earthmoving contractor before retiring with little or no skills on the lathe, so I am doing things the hard way.

The stories are told that the original which was the world's first rail engine, hauled a 10 ton load for nine miles with a speed reaching 5 mph. Far be it for me to doubt such stories, but it must have been a horrifying experience for all involved. There seems to have been no method of controlling the speed short of disengaging the valve gear, which would have involved getting in front (or behind?) and rotating the valve rods — perilous in either direction! Remember they rocket backwards and forwards, travelling approximately 1 foot with the force of 10 x a Mike Tyson punch, and capable of ripping your arms from your shoulder!

The flywheel would have had to be positioned correctly, any rotation of this would have meant moving the 10 ton load, one rotation would have leapt the machine 9 ft forwards! I conclude that the only way was to set it up, stoke the fire, shut the door and wait for the pot to boil and head off, hopefully in the right direction. To stop, some heroic fellow turned the aforementioned handles.

The drawing shows no coupling points that might have towed some sort of tender, but there must have been one to tow the 10 ton load.



It has been fun and challenging to build the model"

The full size story

When I received John's letter and photos I was moved to dig out my copy of Trevithick's biography, and check up on the story. I was lucky to acquire some years ago a copy of *Richard Trevithick, the Engineer and the Man*, by H W Dickinson and Arthur Titley. This was published by Cambridge University Press in 1935 as a centenary commemoration memorial volume.

Figure 1, the diagram of the locomotive, and the portrait of Richard Trevithick are taken from this book.

Richard Trevithick has always been one of my favourite characters in the odyssey of the steam engine. He was born virtually with steam in his veins, as his father, also Richard, was a mine captain in Cornwall. Richard junior was born in 1771, just as James Watt's separate condenser was revolutionising the pumping engines all around the Cornish tin and copper mines. Richard junior went on to sire a dynasty of engineers, in the civil and locomotive fields.

Young Richard grew up into a big and enormously strong man, working in and around the mines. With virtually no formal schooling he showed a natural talent for engineering, and by the age of 19 he was working as an engineer, looking after the huge pumping engines at several local mines. Despite his father's doubts as to his abilities at such a young age, the mine owners were more than happy to make use of his talents.

Before long, Richard started working out his own improvements to the steam engines he serviced, and he tried hard to become an official erector for Boulton and Watt. However, his father had fallen out with James Watt (not a difficult thing, apparently) and so his son was not well received! However, he was employed by various mine owners to help in erecting new pumping engines.

In 1800 James Watts' patents expired, and every man and his dog started building steam engines. Trevithick teamed up with one Andrew Vivian, and in March 1802 they patented a high pressure steam engine for stationary and locomotive use.

By the end of 1803 they had numerous engines in operation all over England and Wales

Samuel Homfray of Penydaren Ironworks became interested in Trevithick's work and ordered a number of his engines, as well as financing Trevithick to experiment and improve on them. Homfray was an able business man and an inveterate gambler.

When Trevithick suggested mounting one of his engines on wheels and using it to tow wagons of iron ore to the canal, Homfray was sure he was on to a winner. In discussing the project with some of his ironmaster friends, Homfray bet Anthony Hill, proprieter of the Plymouth Ironworks, that he would haul ten tons of iron on the tramway by means of a steam engine from Penydaren to the basin at Abercynon on the Glamorganshire Canal, a distance of $9\frac{3}{4}$ miles. To quote from the biography:

"Of the difficulties that were encountered, and how Trevithick surmounted them, we know nothing. It was not until the locomotive was ready that we have a definite account of it, and this it will be well to give in Trevithick's own words. He had reached Penydaren and wrote from there to Davies Giddy (*a well known mathemetician and friend whom Trevithick depended on to confirm his mechanical theories - db*)

Last Saturday (i.e. Feb 11th 1804) we lit the fire in the Tram Waggon and worked it without the wheels to try the engine; on Monday we put it on the tram road. It worked very well, and ran up hill and down with great ease, and was very manageable. We have plenty of steam and power. I expect to work it again tomorrow. Mr Homfray and the gentleman I mentioned in my last, will be home tomorrow. The bet will not be determined until the middle of next week, at which time I should be very happy to see you.

Five days later Trevithick writes:

The tram Waggon have been at work several times. It works exceeding well, and is much more manageable than horses. We have not tried to draw but ten tons at a time yet, but I doubt not but we could draw forty tons at a time very well for 10 tons stands no chance at all with it. ....the engine, with water included, is about 5 tons. It runs up the tram road of 2 inch in the yard 40 strokes a minute with the empty waggons. The engine moves 9 feet at every stroke. The public is much taken up with it.'

Trevithick goes on to explain that the bet was for 500 guineas, an enormous amount of money at that time, and that he had turned the exhaust steam into the chimney about 3ft above the fire. 'When the engine is running at 40 strokes per minute not the smallest particle of steam appears out the top of the chimney, which is about 8ft above where the exhaust is fed in.' He also notes that the fire burns much better when the exhaust is going into the chimney, once the engine is running.

Two days later Trevithick announced that the trial had taken place the previous day, Tuesday February 21st, 1804, a date forever memorable in the history of the locomotive.

'Yesterday we proceeded on our journey with the engine; we carried ten tons of iron, five waggons, and 70 men riding on them the whole of the journey. It's above 9 miles which we performed in 4 hours and 5 minutes, but we had to cut down some trees and remove some large rocks out of the road. The engine, while working, went nearly five miles per hour; there was no water put in the boiler from the time we started until we arrived at our journey's end. The coal consumed was 2 cwt. On our return home, about 4 miles from the shipping place of the iron, one of the small bolts that fastened the axle to the boiler broke, and let all the water out of the boiler, which prevented the engine returning until the evening. The gentleman that bet 500 guineas against it rode the whole of the journey with us and is satisfied that he lost his bet. We shall continue to work on the road, and shall take 40 tons the next journey. The public until now called me a scheming fellow but now their tone is much altered!'

Richard Trevithick

And so ended the first ever run by a steam locomotive on rails. Needless to say, Hill tried to wriggle out of paying up on his bet, but apparently eventually was made to pay!

This is also the first known report of exhaust steam being put up the chimney of a steam engine, another historic advance.

I have no doubt that some sort of throttle or steam valve would have been built into the engine, but juggling the valve handles would have been child's play to someone like Trevithick! Unfortunately for him the loco was before its time, as its weight was too much for the tramways then in use, and broken rails were a constant problem. It wasn't until George Stephenson came into the picture and engineered the Stockton and Darlington Railway which opened in 1825 that the age of the steam railway really began.

Trevithick today

Today the name of Trevithick is still revered in Cornwall, and the Trevithick Society preserves some of the early engines and mine sites in Cornwall, as well as publishing regular newsletters and journals. The Society web site is www.zawn.freeserve.co.uk and has much interesting information. Membership enquiries for the society can be sent to Paul Smith, Trevithick Society Membership Secretary, 71 St. Norbert Drive, Kirk Hallam, Ilkeston, DE7 4EF, Derbyshire, UK or by email on cnfrench@zawn.freeserve.co.uk

Thanks for an interesting model that tells an interesting story, John!

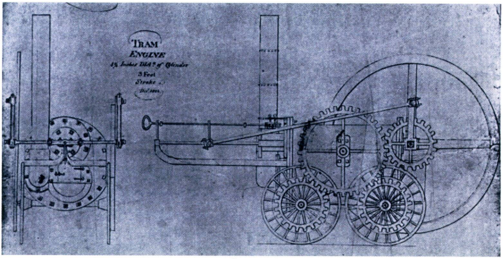
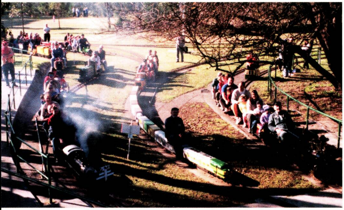


Figure 1

Central Coast Steam Model Co-op 21st Annual Birthday Run

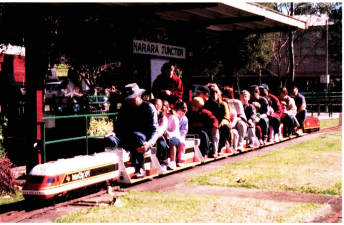
Photos by Graham Bearman



Group photo of the trains during the public running

Stan Smith's freelance 7¼" gauge diesel

Tom Walker's 5" QR A10 looks on as Shane Mallitt's 7¼" narrow gauge Bluegum gets steam up



Alan Fogarty and 5" XPT banked by John Gordon and 42105

Brian Muston (West Ryde) and LNER B1 on the trestle

Keith Lewis and his 5" P class with Rebeka Lougher and Edith Bearman

Peter Meddows (LMLSLS) driving his wife's diesel Flying Scotswoman

Not many empty stomachs among this lot on Saturday evening

Australian Model Engineering

UNDER 25s ENCOURAGEMENT AWARD

2004 Entry Form

Name .... Age ....

Address ....

....

.... Phone ....

Club or Society (if applicable) ....

Qualifications and/or occupation ....

....

....

Brief description of entry ....

....

....

....

Approx. dimensions & weight .... (enclose photo if possible)

Equipment used in construction (e.g. lathe, drill press, hand tools, etc.) ....

....

....

....

Other information relating to the entry (e.g. outline of construction and assistance had, if any) ....

....

....

Australian Model Engineering undertakes that the privacy of entrants will be respected.

I hereby declare that:

1. I have personally contructed at least 75% of my entry
2. I was under 25 years of age as at 31st December, 2003
3. I agree to the conditions of entry and that the judges decision will be final
4. I agree to display the entry at the 2004 AALS Convention site for the purposes of judging

Signature .... Date ....

The AME Under 25s Encouragement Award

Conditions of Entry

Younger model engineers are making grea contribution to the hobby, even though the are often hampered by having less access t tools and resources than older model engineers *AME* instigated this award in 1993 to encourage under 25s to show their talents; to engender spirit of encouragement in more experience model engineers; and in a small way to foste the growth of participation by people in th younger age range.

We've been pleased to hear that a numbe of under-25s have been spurred on to complet their models by the thought of participating i the award.

If you fit the age criteria, photocopy th entry form on ths page, post or fax it to *AME* and start a-fittin' and a-turnin'!

Age criteria

If you turn 25 in the 2004 calendar yea or later, you are eligible. If you turned 25 i the 2003 calendar year or earlier you are no eligible.

Entries

May be any model or experimenta engineering item or model. For example it ca be a steam, diesel or electric outline locomotive steam, internal combustion, electric, hot air and Stirling cycle, stationary or mobile plant o road vehicles; boats or ships with any form o power drive; marine plant; workshop equipment jigs, fixtures and aids to manufacture; clocks and other horological or astronomical items electronic, programmable logic, digital and analogue controls and monitoring of any of the above models or any other item(s) which the judges consider relevant to model engineering.

Judging

The following are taken into consideration:

- Age of the entrant and skills relevant to age.
- The ambitiousness of the project.
- The workmanship of the project.
- The access to workshop facilities.
- The location to resources and materials.
- The formal skills of the entrant.

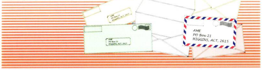
The above is intended to even out the playing field so that the judges may look at each entry all things considered. The idea is that the thirteen year old student (with no formal mechanical skills) from the Back`O'Bourke who works in a tin shed with pistol drill, hacksaw, file and hand scraper to build a model of a ferris wheel has as much chance as the 25-year-old qualified thou-splitting toolmaker with a CNC workshop and limitless resources who has turned out a VR H class 4-8-4 with working stoker engine!

Have a go!

The presentation will take place at the AALS convention at Bunbury this coming Easter. Entries will be received up to day one of the convention. The perpetual trophy will be awarded at the AALS presentation night on Sunday evening. A prize (to keep) relevant to the winner's interest in the hobby will also be presented.

So come on all you younger model engineers, let's see the tables with plenty of entries on them in Bunbury this Easter!

Letter Box



Parting off

Sir,

I am a regular patron of your magazine and have been for quite a few years. I am not in any club but have made about 16 models of earth moving gear and cranes. Some weigh up to 400 lbs. .... I am a retired fitter and turner and had nearly 50 years on the tools.

.... I would like to pass on my advice on parting off ... for people who struggle with lathe work. To start you must use a coolant when drilling and parting off. I use a tungsten carbide tipped blade in a home made holder that I copied. The coolant can either be tipped on by hand but I made up a constant flow with a pump, a tank and a telescopic end with a flexible line out of a small flouro light. The telly end can be made from a shower arm or 2 pieces of copper pipe with a petrol union nut screwed onto the end with a rubber 'O' ring in it. A tap, etc. used also.

The coolant is made up of a small quantity of soluble oil mixed in water — just enough to make the water milky. If parting off is done dry the tool gets hot and expands wider. The cut in the material mostly expands together so you eventually get a big crash and there goes the tool. You don't have to have fancy ground down tools as described in *Letter Box*. I have a 7" Lang AGH lathe which I use the tipped blade on. I have a Hercus 'A' bought new for 250 pounds many years ago. I use a piece of ½" square tool steel ground to form a parting tool. Give the tool a slight front clearance and the side also — not too much as it will weaken the blade. The top rake, or clearance, doesn't need much — tip it upside down and hollow grind the top is usually enough. The parting tool should be set dead on center. This can be done by facing the end of a piece of round and the center is found easily. Pack the tool to suit: never have it above or below center. With the tipped blade, if I am parting off a piece of say, 3" or 4" round, I usually place a six inch rule across the face at the end of job. Try the tool on either side with the rule to make sure it is set right and not going to go in on the angle.

Another thing to watch is if the blade cutting tip wears on one side it will not part off true. The dull or blunt point will gradually push away and you will get either a convex or concave face. I have very rarely had trouble parting off. Don't part off in back gear unless a big diameter or cast iron. Run at a reasonable speed and keep a reasonable pressure. I have seen pieces of steel with broken blades in it and even broken holders, all caused through parting off dry. The coolant doesn't really cool the material, it lubricates the chip and causes less friction. I use coolant on steel, cast iron, plastic, copper and stainless steel. Brass is OK. It's the same with drilling — use a coolant (not engine oil). I usually use coolant on cast iron — it keeps the dust out of your nose and keeps the job cool, especially if you are working to a micrometer size. Most will tell you it's not necessary on cast iron, but you have to cool it anyway to get your finished size. I find with nylon or plastic it drills and parts off better. It's not needed for general turning. Always part off as close to the chuck as possible. I rarely use a 3-jaw chuck on my big lathe — always an independent 4-jaw, 10" in diameter. I can set a surface gauge to within a thou and very rarely use an indicator. To part off in a 3-jaw you don't have enough support and this will cause trouble. ....Heavy cuts in a 3-jaw chuck causes problems — the job will move into the chuck and if you have a center in the tail stock then it is left high and dry. My advice again is never part of steel, etc. dry; always use a coolant and the tool dead center.

George Pearless

New South Wales

Drawing ellipses

Sir,

The article on page 14 in issue 111 (Nov-Dec '03) relating to laying out an ellipse is not correct!

There is no need to fiddle with length of string or move pins to achieve the perfect result. I learned the formula when I was an apprentice cabinet maker, around 56 years ago, so it took a bit of brain search to bring it all back to me. All that is needed is to know the major length and minor length of the two axes of the proposed ellipse. These are plotted at 90° to each other, centers intersecting. If the job is small, set dividers to half the major axis. From the outer ends of the minor axis, strike arcs on the major axis. Pins are then set at the crossed arcs on the major and one pin at one end of the minor. Pull a piece of non-stretch thread or twine around the three pins and tie off to form an endless loop of thread, keeping thread taut. Remove the pin from the minor, insert a pen or pencil inside the circle of thread and begin to draw the desired shape. To quote the sideshow spruiker "before your very eyes" you will see the ellipse develop, touching all four extremities of the layout. Give it a go, it is quite fascinating, and much like watching the rods in motion of a slow moving locomotive.

N Nilsen

Queensland

(Having tried both methods and achieved the same result, I would say they are both valid — more like variations on a theme ... Ed.)

"The Kettle"

Australian Miniature Boiler Safety Committee — December, 2003

We have an unfortunate situation develop this month, with the publication of the *AME* editorial in the last issue.

This appeared to be aimed particularly towards AMBSC Executive, and the way in which we are handling the "Garden Railways" phenomenon. If that editorial was intended to stir up some action, it has succeeded. If it was intended to inform the readership in an unbiased way, it has failed dismally.

There are several facts which readers should now know about; the reason that they have not been informed up to this point is that the process has apparently stalled, and there has been nothing concrete to report.

Several discussions have taken place between a small self-interest group supposedly representing the smaller gauge enthusiasts in our hobby. Attempts by AMBSC to have this group widen their representation has been met with great reluctance. When the group, known to AMBSC as RitGoG, first presented what they wanted to AMBSC, it was unacceptable in its then form to the AMBSC executive to take to WorkCover. An all-day meeting of six people (including representatives from the model ship fraternity) went through the document trying to put it into a suitable shape and format, and get the details sensible. When a second draft was presented back to RitGoG, the apparent attitude was that it was all too much trouble, too much detail, too much paperwork, and they only wanted to "just play trains" without jumping through hoops. (Wouldn't we all!) It was indicated that they wanted nothing further to do with the whole process. Since that time, efforts have continued within the AMBSC executive to arrive at a suitable document.

One obstacle now facing AMBSC is who do we present it to for consideration before going to WorkCover? There seems to be no-one within the garden gauge group(s) who wishes to do the work (and who represents a broad range of modellers rather than just one club), preferring to leave it to "them", while they continue to "just play trains".

Some of the difficulty lies with the "commercial" suppliers of boilers. RitGoG wanted them all to have a blanket approval, without necessarily having details of design or construction, and without serial numbers or other methods of traceability. Contact with practically all known manufacturers has since been made, with roughly 50% willing to submit design and construction details and modify their practices a bit, the other 50% basically saying they would not co-operate. A few of them seem to have no demonstrable quality control procedures in place. Some of them are small businesses, which may (or may not) carry manufacturers product liability insurance, and may well disappear if ever they are sued.

A second area of difficulty lies with individual builders within the hobby who, among other things, have expressed reluctance at having to stamp AMBSC registration numbers on their boilers. Reasons given include that the material is too thin to stamp without distortion, and because the numbers are at least six characters, and must be readable in situ and this really is a problem. While it is a problem, it seems that owner builders constitute only about 10-20% of the boilers being considered, but their presence must still be accommodated.

Having seen exhibitions of these locos at Liverpool and elsewhere, just a casual observation suggests that they are mostly narrow gauge models, with very short trains, and one wonders why the participants have the need for a pressure greater than the lower limit of 35psi. It is only the high pressure that brings them within the AMBSC scope; most of them are below the 50mm diameter barrel and 1 litre limits. It is accepted that at 35psi they are inefficient, but let's be sensible about this, we are talking about 0.1 - 0.8% efficiency at best.

Perhaps it should be repeated that if the boilers are limited to 1 litre of water volume, AND a maximum barrel diameter of 50mm, AND a maximum pressure of 35 psi, then they are not regulated at all, by anyone. If the garden gauge enthusiasts insist on not having to write, adopt and operate a code they can work with but which is acceptable to WorkCover, then they either fit in with the above quoted limits, or carry their own risk. If they wish to have the protection that AMBSC is able to offer, then some co-operation and some willingness to do some hard work is necessary.

It also bears repeating that AMBSC is the whole group of volunteer club boiler inspectors, who also wish to continue to enjoy their particular interest in the hobby, which may or may not include garden gauges. This goes for the executive as well, who, while willing to assist the garden gauges, do not see any compulsion to do all the work for them while they "just play trains" and complain about any attempt to have them follow rules like the rest of the hobby does.

Some FACTS may not go astray at this point:

In 1983, the then DLI in NSW Chief Boiler Inspector insisted that the Codes include both upper and lower design parameters. So was born the limits on pressure, volume, and barrel diameter. To obviate a clash with "toys", such as Mamod, Wilesco, etc, the lower limits of 35psi, 1 litre, and 2" diameter were agreed upon. At that time, Garden Gauges were very much in their infancy, if at all. It was felt that this provision would adequately cover the situation, and allow these boilers to operate without any "Government interference".

However, over the years, for a number of reasons, the commercial builders of these boilers have increased their pressures, which, legally brings them into AMBSC Codes. Please note, though, that this only applies where a boiler is to be operated in public. In your own backyard, anything goes!

In Law, if a boiler is operated in public within the parameters of the code, then it MUST be certificated under Occupational Health & Safety Legislation. Most of these boilers are built by commercial operators, whereas the Codes were prepared originally for owner/builders, as a hobby.

As noted earlier, we have been working for some time now to resolve this issue, with the RitGoG group, with a meeting being held on Saturday 8th November last, to review progress on the AMBSC Code Part 3 sub-miniature boilers. We have had no official contact from any other group, other than the Maritime Modellers of Australia. If there ARE a number "out there", then why haven't they approached us? In at least one instance where a kit has been purchased from overseas, the owner refused to let an AMBSC Boiler Inspector test it, in order that it could run in his own Club. That doesn't help! Barry Glover has spent his own money travelling overseas, and has visited at least one supplier.

It is not easy nowadays to revise Codes like these. Any changes would have to be approved by each State's OH & S legislation, but we need a consensus of ideas throughout the country among ourselves, before that can happen. Until someone starts some constructive dialogue with AMBSC, then nothing will happen. We are still open to comments, and would be willing to produce a code, if required. As mentioned earlier, this process has already started, but it requires much more helpful comments than those received so far!

Ian Kirby (Chairman) *Dave Merrifield* (Hon Secretary)

Gentlemen,

Re your opening statement, the intention of the editorial was to stir up some action or discussion, not pass on information. To inform would be in a different part of the magazine. The editorial is simply an expression of opinion, sometimes slanted to achieve a result. It was certainly not meant to be taken personally by the executive as an insult (if I took everything negative that is said to me about the magazine personally, I would have given up on it a few years ago). The comments made are simply a reflection of what I hear on a regular basis and are therefore the views held by a number of people. Whether they are right or wrong is not for me to judge, but in my opinion a perceived problem is in fact a real problem, or very soon will be.

I believe that when most people have read this "Kettle" they will be much more aware of what is being and has been done and what frustrations have occurred. Ninety percent of the (perceived) problem is most likely because this information has not been communicated before and people other than those directly involved were not aware that anything was actually being done. Had I not written that editorial I daresay that this "Kettle" would not have been written and people would not now be aware of the work you have been doing and the problems you have encountered. In this regard I would have to say the editorial was a success. In fairness, I am aware that AMBSC does not really have a mandate to do anything other than to simply assist those who have brought their models into the sphere of the AMBSC Codes and therefore no obligation to communicate to the hobby at large, but I suspect that most people are not even aware of that. The majority of people involved in the hobby these days were not involved back in the days when the role of AMBSC was more widely known and understood. Whatever the situation, free flowing communication is the best way of eliminating most problems, perceived or otherwise, and I would urge you to make more frequent use of the "Kettle". I like to think we are all on the same side — the side of our hobby ... Ed.

News Desk

with David Proctor

Another issue where we have run a bit short on space which means columns like this one are the first to be pruned back.

Firstly I will just repeat a bit of information which has appeared elsewhere in this issue. Some copper suppliers have indicated that 1$^{3}/_{4}$" copper tube is becoming very difficult to obtain. *Edwin* designer Brian Wilson has managed to buy 6m of this tube and is able to supply enough for about 30 boilers for the cost of the copper plus postage, which is $25.00. (see page 56).

AME email addresses

The more observant of you will have noticed different email addresses through out this magazine for myself and **AME Retail**.

Mine is: editor@ameng.com.au

Retail is: sales@ameng.com.au

The old email addresses will still continue to work as well — these new ones simply send emails to them. The reason for

(Continued next page ...)

(News Desk — continued from previous page ...)

the change is that on any future occasion any change in email addresses or personnel will not mean changes in *AME* contact details — these email addresses are permanent ones which can be directed to anyone anywhere, thereby giving *AME* a more permanent identity.

Trade & commercial

Stuart Models in the UK have sent me a copy of their latest catalogue which which is the 75th Edition, 2003-2005. This catalogue is in full colour and larger than previous editions (80 pages), giving more space for the promotion of new products like the range of workshop models which are being introduced over the next 18 months.

The first model in this range is an Engineering Lathe which is 8½" long and comes as a set of castings, a machined kit or ready to run. This is their best and most informative catalogue to date. Further details can be obtained from their Australian agent: **EMCO Machine Tools**, a regular advertiser in *AME*.

Binders

We have placed an order for binders which will hold 12 issues (2 years) of *AME*. They are vinyl, use plastic inserts and carry the *AME* logo. Delivery has yet to be confirmed but they should be available early in January through **AME Retail**.

Until next issue, great steaming, and if you are going on holiday, we hope it is a safe one.

David

Classifieds

For Sale –7¼" Gauge *L'il Lima* 2-4-0

- Keith Watson design, Briggs type steel boiler to 100psi, AMBSC boiler certificate. Injector, twin axle pump, tender hand pump, vacuum brake to tender and train pipe. Head and cab lighting with 6v battery. Loco comes with trailer (Vic registered), tailored canvas cover, and storage trolley. $16,000 ONO. Further details and photo, Bill Chalmers (02) 6072 3582. Email: bchalmers@albury.net.au

G Gauge locos and track for sale

- 0-4-0 Switcher steam loco with sloping tender (Pennsylvania), very good condition. $180 ono.
- 2-8-0 Consolidated steam loco with tender, as new. $420 ono.
- ALCO FA1 diesel, A+B+A units (3), for B&O, as new $700 ono.
- 4-6-2 Pacific tender steam loco with sound (Pennsylvania), as new. $650 ono.
- ALCO RS-3 diesel (Amtrak), as new $290 ono.
- Also have approx. 200 feet straight brass track in various lengths. Sell at $6.00 per foot.
- 8 foot diameter curved track, 32 pieces (16 pieces form one 8 foot dia. circle). Sell at $180 for 16 pieces.
- 10 foot dia. curved track, 24 pieces (12 pieces form one 10 foot dia. circle). Sell at $230 for 12 pieces. Phone Nigel (029777 4668

Full size vertical Weir pump for sale

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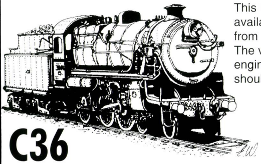

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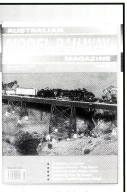

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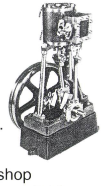

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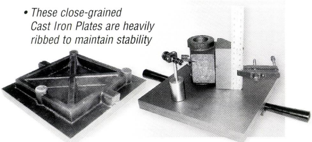

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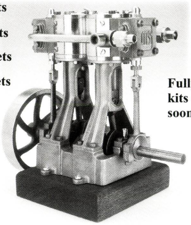

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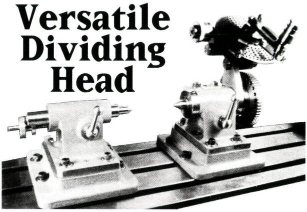

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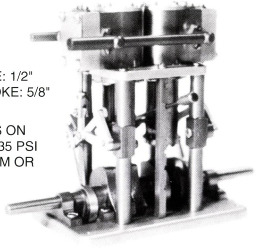

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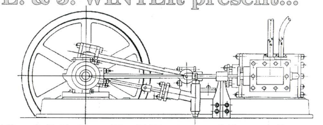

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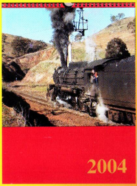

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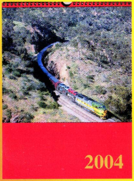

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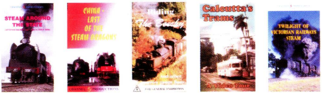
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